NTSC/PAL/SECAM/PAL-M

BETACAM

Catch the World on Your Shoulder

Sony Broadcast

SONY®

Betacam Family

The Betacam Fully Integrated System

In 1982, Sony announced the BVW-1/3 Betacam Recording Cameras and the BVW-10 Studio Player followed by the introduction, in 1983, of the BVW-20 Field Player and the BVW-40 Studio Recorder/player. Since then, the Betacam system has been widely selected throughout the world for ENG/EFP operations, due to its extreme mobility, reliability and operating simplicity. High picture quality, production immediacy, and compatibility with existing equipment have specially appealed to broadcasters worldwide.

Now, with the introduction of the BVC-10/11 Betacam Multi-Cassette System and the BVW-30 3-tube Plumbicon™ Betacam, Sony has completed the Betacam concept as an integrated system provided for ENG/EFP operations from signal origination and recording, through studio editing, to on-air broadcasting.

The Betacam VTRs feature Sony's innovative Compressed Time Division Multiplex recording technique which, using the readily available Beta 1/2-inch videocassette, delivers superior picture performance. In a total system, Betacam-produced tapes maintain high picture quality from original recording to post-production and on-air distribution with the benefit of immediacy.

System flexibility is another criterion which Betacam meets. The versatile Betacam components take full advantage of the ability to completely interface with existing video equipment. A number of accessories are available to further enhance system flexibility.

In this way, the superbly integrated Betacam system provides immediate and reliable production performance resulting in distribution/transmission with an exceptionally high picture quality meeting a wide range of ENG/EFP applications.

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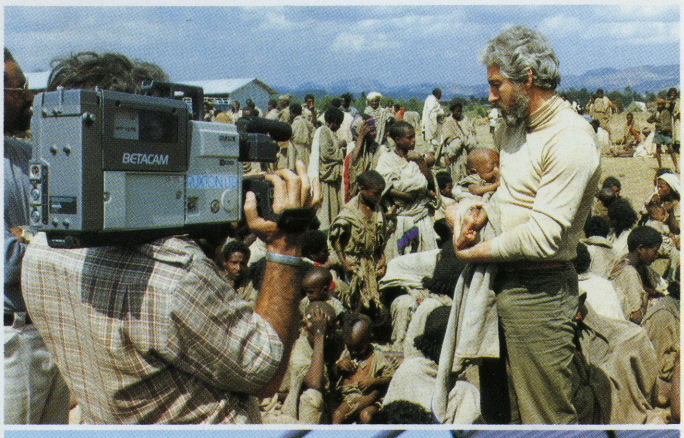
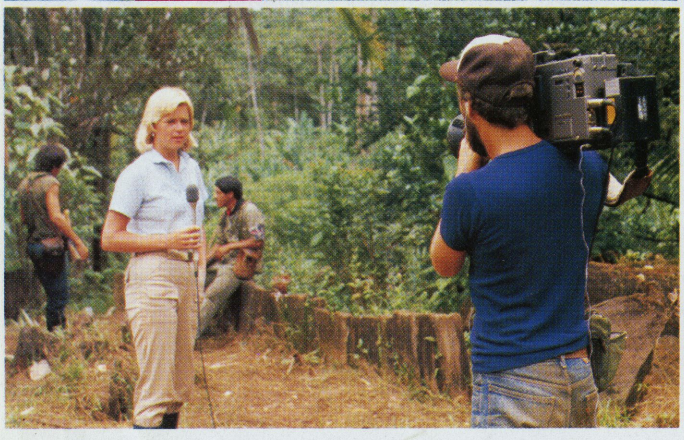
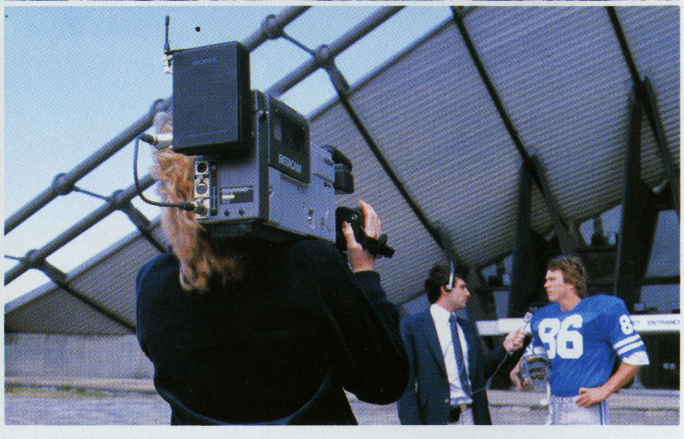
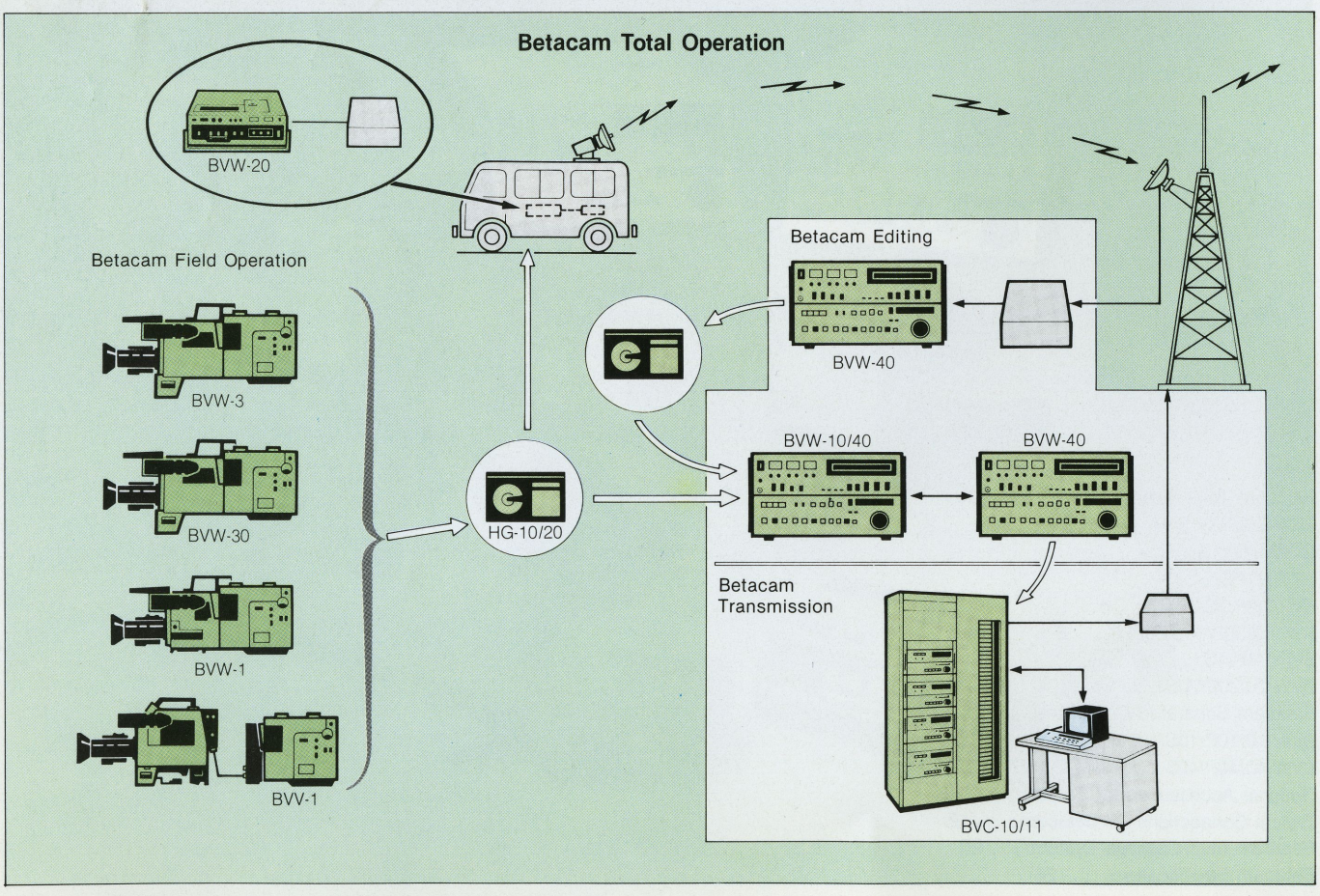
Betacam Total System







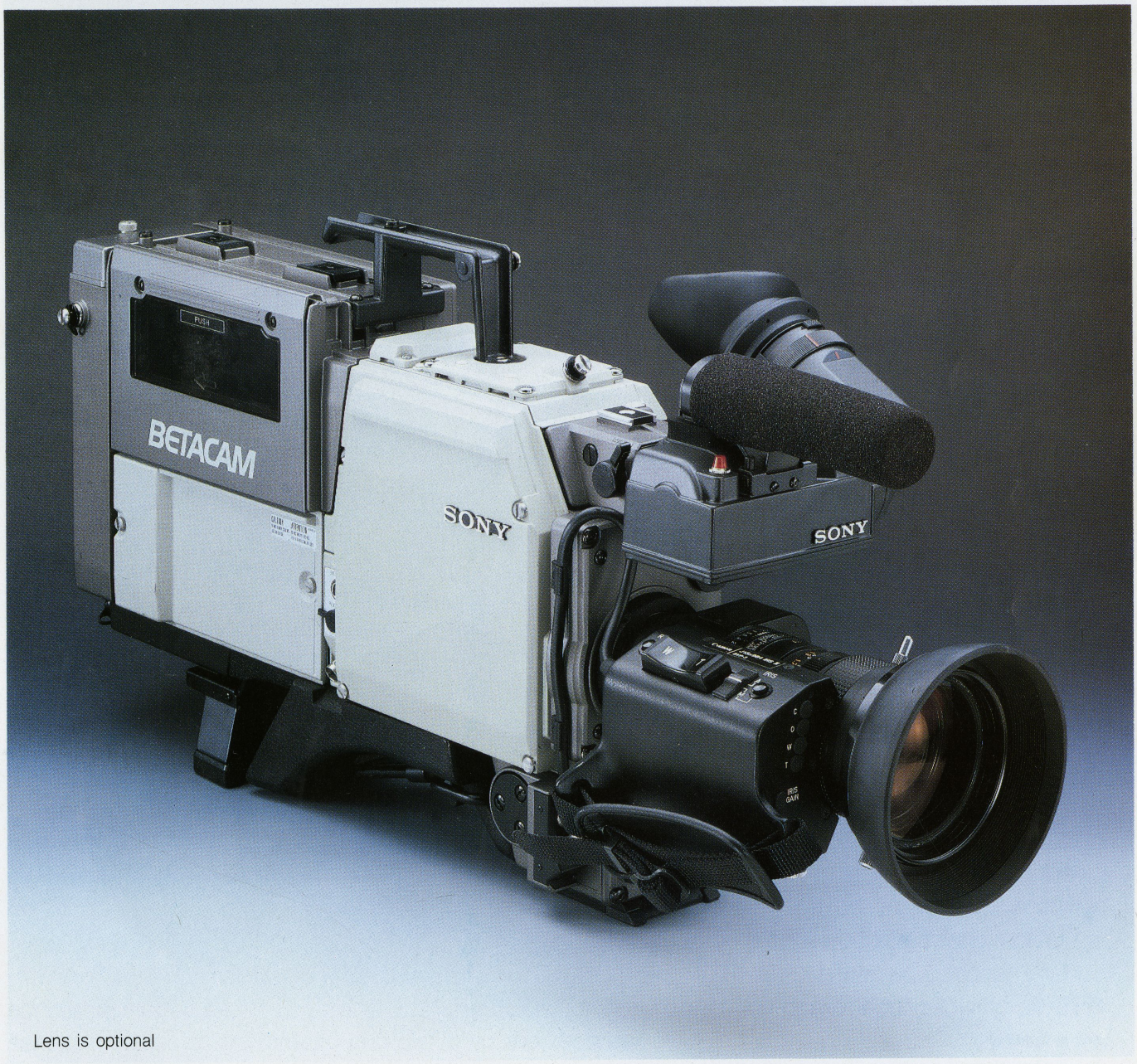


VTR in Camera

Betacam Recorder with 3-tube Camera

BVW-3/3P/3S/3PM
BVW-30/30P/30S/30PM

(NTSC) (PAL) (SECAM) (PAL-M)



Lens is optional

The Betacam VTR in camera types BVW-3 and BVW-30 provide fast and reliable field production performance having simple, convenient operation and superb picture quality.

The BVW-3/BVW-30 are compact and lightweight units with rugged and fully-balanced construction, offering full mobility and reliability on the ENG/EFP scene. These recording cameras also feature exceptional picture quality. Adopting a 3-tube 2/3-inch Saticon™ with Electrostatic Deflection System for the BVW-3, and a 3-tube 2/3-inch Plumbicon™ with Electrostatic Deflection System for the BVW-30, both possess excellent performance characteristics.

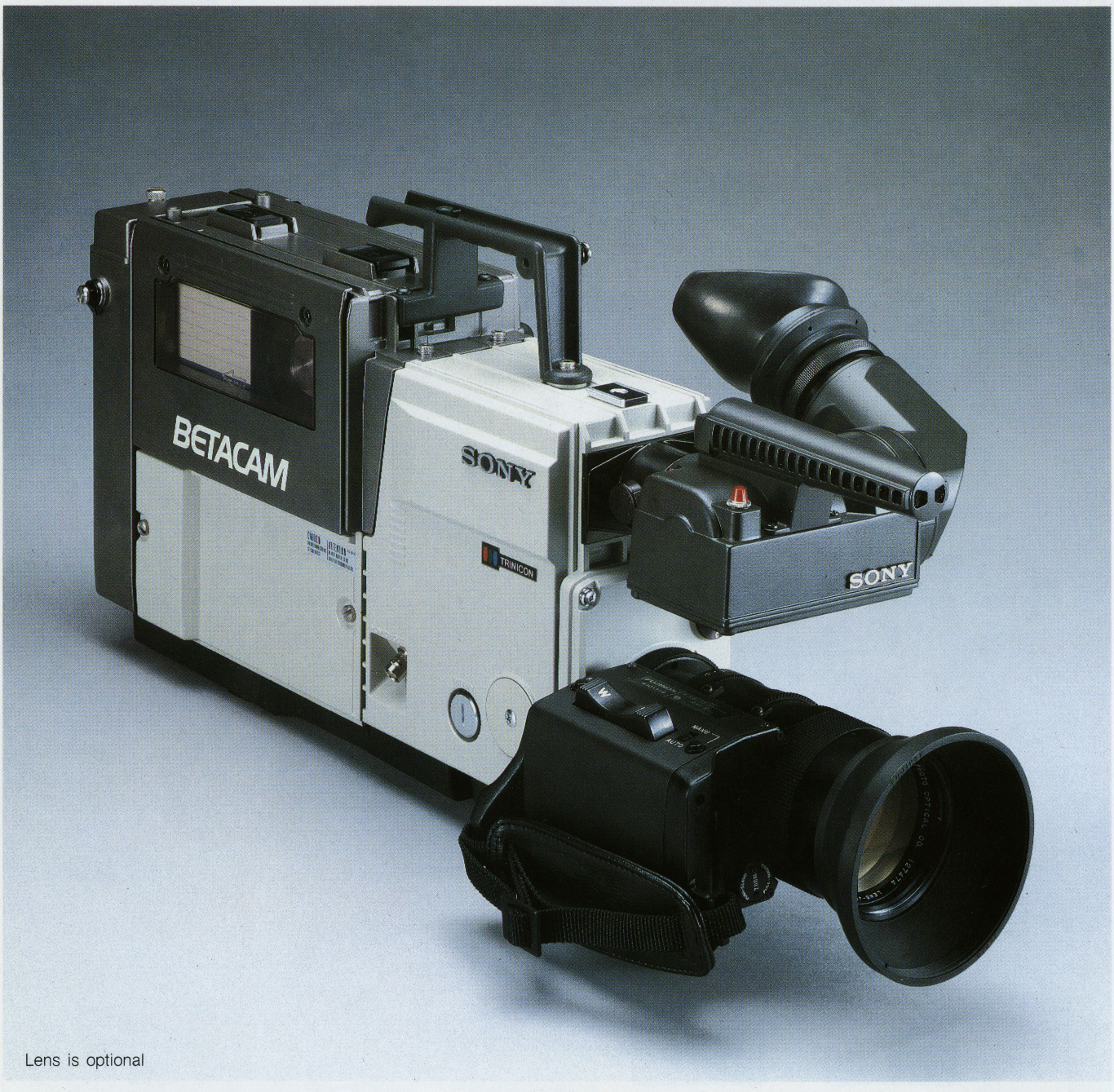
The special recording process—Compressed Time Division Multiplex—adopted in the Betacam recording system achieves high picture performance using 1/2-inch videocassettes.

VTR in Camera

Betacam Recorder with Single-tube Camera

BVW-1/1P/1S

(NTSC) (PAL) (SECAM)



Lens is optional

The Betacam BVW-1 is a compact and lightweight VTR in Camera specially designed for ENG application, weighing only 6.8 kg (15 lb) without lens. The BVW-1 adopts the single-tube 2/3-inch HBST (High Band SMF Trinicon™) in its camera section to realize the highest mobility and uncompromising picture quality with the new advanced recording format—Compressed Time Division Multiplex. The single-tube Betacam, which has operating ease and the same rugged and well-balanced construction as the BVW-3/BVW-30, delivers reliable and speedy shooting in any tough ENG situation. The BVW-1 is a most suitable VTR/camera combination for new ENG requirements.

Betacam Recorder

Betacam Recorder

BVV-1/1PS

(NTSC) (PAL/SECAM)

VA-1V is optional

By the adoption of the 1/2-inch videocassette with its small drum scanner, the BVV-1 Portable Recorder combines compactness with rugged construction in a lightweight package weighing only 3.4 kg (7.5 lb). The advanced and newly developed Betacam Recording Format, employing Compressed Time Division Multiplex techniques, provides superior picture performance and allows common electronic and mechanical assemblies to be used in all units operating on either 525/60 (NTSC/PAL-M) or 625/50 (PAL/SECAM) standards. Identical 625/50 recordings are made on the BVV-1 for subsequent encoding to PAL or SECAM standards when replayed. In addition, a built-in Time Code Generator provides Time Code information for recording on a dedicated longitudinal track.

The BVV-1 can be operated as an independent recording VTR using either an optional VA-1 adaptor for component input or a VA-1V adaptor for component/composite input allowing all BVP-series cameras to be directly connected to the recorder.

Betacam Format

The Betacam Format records luminance and chrominance information on separate tracks using independent video heads. Chrominance component signals, R-Y, B-Y, are compressed and multiplexed for recording on the chrominance track without crosstalk between the two signals. The luminance signal is recorded directly on the second track. In this way, wide bandwidth recording is possible for both luminance and chrominance signals. The complete Betacam recording format consists of two separate helical video tracks (one for luminance, one for compressed and multiplexed R-Y, B-Y signals) and four longitudinal tracks—Audio 1, Audio 2, Control and Time Code Track.

In addition to providing high picture quality, the Betacam Format has the further advantage of a high degree of commonality of components used in all units, irrespective of TV standards. Since the video track width is the same for 525/60 and 625/50 systems identical electronic and mechanical assemblies can be used including video heads and scanner. Service and maintenance is thereby simplified and is readily available throughout the world. There is also an excellent opportunity to provide, with some further technological development, a switchable video recorder capable of operation in both 525/60 and 625/50 standards.

Betacam Recorder

Betacam Recorder

BVV-1/1PS

(NTSC) (PAL/SECAM)

Features

Superior Picture Quality

The Compressed Time Division Multiplex recording system employed in Betacam provides outstanding picture quality with excellent signal to noise ratio and there is no crosstalk between chrominance components.

Compact and Lightweight

The adoption of the 1/2-inch Beta cassette with its small scanner and the use of high density packaging has enabled the realization of a compact and lightweight unit. The use of a magnesium diecast frame contributes to saving in weight and also provides very rugged construction.

Low Power Consumption

Considerable reduction in power consumption has been achieved by the use of only one high speed coreless motor to drive both the drum and tape reels. This, combined with the extensive use of LSI, the advanced circuit design and high density packaging has enabled the total power consumption to be redused to 10W.

20/24 Minutes Recording Time

The BVV-1 uses a standard Beta 1/2-inch HG-20 videocassette to provide a full 20 minutes of recording on NTSC models and 24 minutes on PAL/SECAM models.

Rec-Run/Free-Run Select

Time Code is switchable to operate in either Rec-Run or Free-Run mode. Six push buttons are provided for time adjustment.

Time Display

A 6-digit LED display is provided for indication of Tape Time, Time Code or User Bits.

Back-Space Edit

Automatic back-space edit gives sequential recording without picture break-up at transition points.

Built-in Time Code Generator

SMPTE/EBU Time Code is automatically recorded on the dedicated time code track. An internal adjustment allows the unit to operate in either Drop Frame or Non-Drop Frame mode.

Hexadecimal User Bits can also be generated and recorded.

Warning Indicators

Six red LEDs provide comprehensive function/malfunction indications.

RF	:	Indicates video circuits failure or head clogging.
SERVO	:	Indicates that the servo system has not locked.
HUMID	:	Indicates condensation on the head drum.
SLACK	:	Indicates that tape tension is incorrect.
TAPE END	:	This indicator commences blinking about 2 minutes from the end of the tape.
BATTERY	:	This indicator commences blinking when battery voltage falls below 11.45 volts and lights continuously below 11.0 volts.

Time adjustment buttons

Audio Inputs

Two independent 3-position selector switches are provided to route the appropriate audio source to Audio Ch-1 and Ch-2. This source may be the built-in microphone, an external microphone or an audio line input.

Slide-in Battery

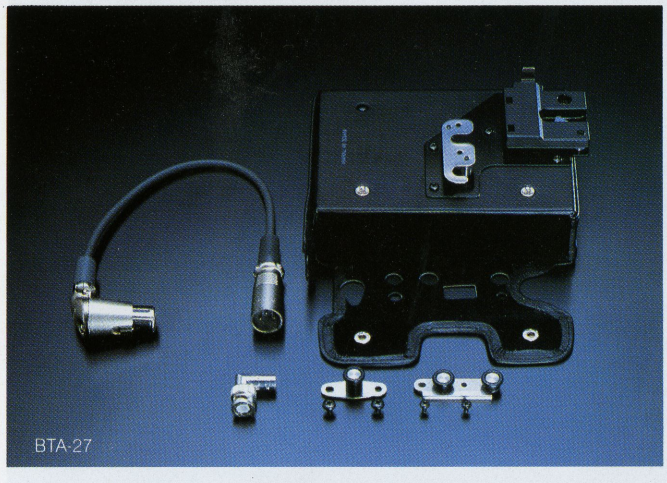
A single NP-1 rechargeable NiCd battery can be housed in a compartment of the BVV-1. It is able to provide sufficient power to the BVW-1 combined camera/recorder for 45 minutes continuous operation.

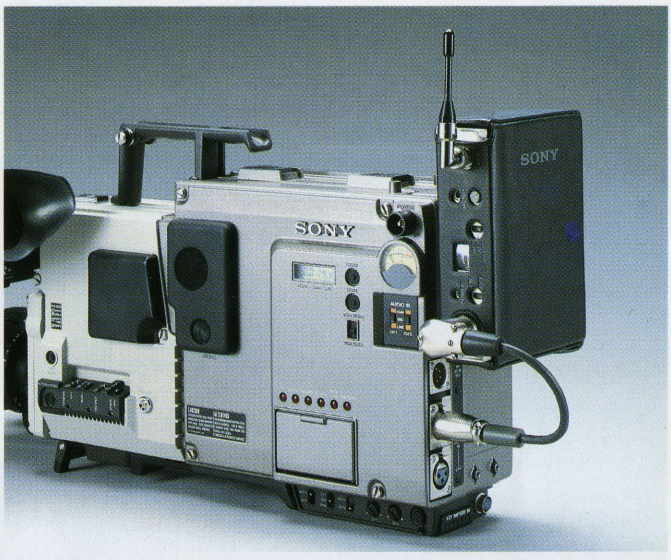
Built-in Monitor Loudspeaker

An audio monitor loudspeaker built into the BVV-1 further enhances its cableless construction concept. During recording, mixed sound from the two audio channels can be monitored. Audible alarm tones are also fed to the loudspeaker.
An earphone may be connected to the recorder. This disconnects the sound fed to the loudspeaker automatically, and the earphone assumes all monitoring functions.

Wireless Microphone (option)

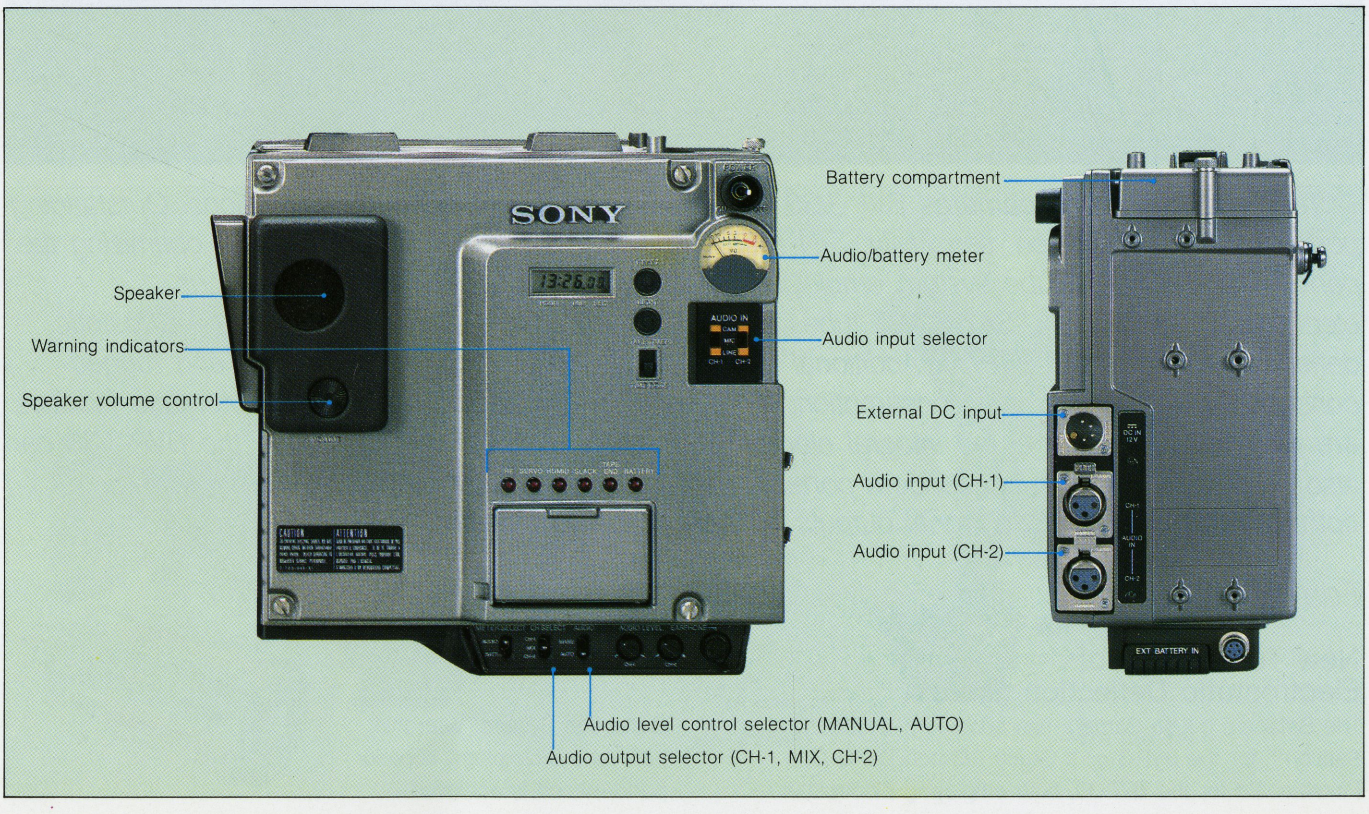
A Wireless Microphone Receiver type WRR-27 can be mounted on the rear of the BVV-1 using the optional Attachment Kit BTA-27. This can then be used in addition to, or instead of, the built-in directional microphone mounted on the camera.


BTA-27



Audio Level Adjustment

Audio level can be selected to be controlled either automatically, or manually. Two gain controls are provided, one for each audio channel, the other for use in the manual mode.

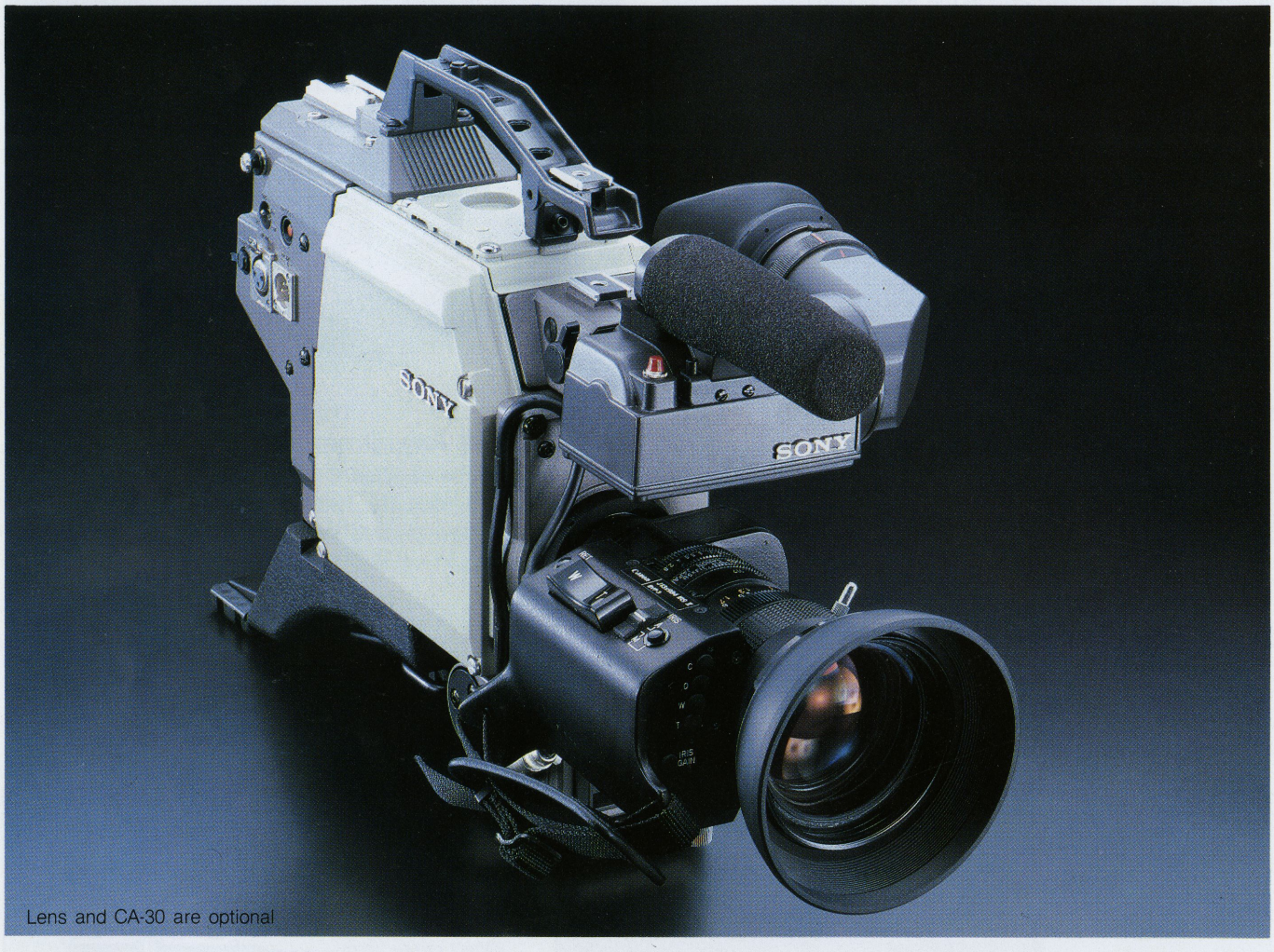


Betacam Camera

3-tube Camera

BVP-3/3P/3S/3PM
BVP-30/30P/30S/30PM

(NTSC) (PAL) (SECAM) (PAL-M)



Lens and CA-30 are optional

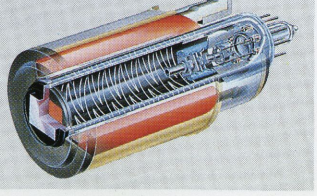
The Betacam 3-tube cameras BVP-3/30 are ideally suited for ENG/EFP applications. Outstanding performance in resolution, sensitivity, S/N ratio, lag, and color fidelity is achieved by optimizing the performance of the 3-tube system employing the newly developed MF (magnetic focus, electrostatic deflection), "SATICON" tubes in the BVP-3 or Diode Gun Plumbicon™ (electrostatic deflection) tubes in the BVP-30. Additional useful features are compact, lightweight and rugged construction with low power consumption. A full range of setup and operational automatic facilities are provided. Designed as an integral element in the Betacam recording system, the BVP-3/30 can also be operated as an independent portable camera using the CA-3/CA-30 Camera Adaptor for both component/composite signal outputs for connection to portable VTRs.

Features

New Technology of Electrostatic Deflection System

The Betacam 3-tube Camera has adopted a 3-tube 2/3-inch Saticon™ for the BVP-3 or a 3-tube 2/3-inch Diode Gun Plumbicon™ for the BVP-30, both employing Electrostatic Deflection System. With this new tube technology, superior performance is achieved.

MF "SATICON"



High Resolution

Center resolution of 650 TV lines can be achieved, exceptionally high for a portable camera due to the MF "SATICON" tubes used in the BVP-3 or the new PbO tubes in the BVP-30. Corner resolution is also improved in both cameras, since a constant beam focus can be maintained over the active area of the tube face.

High Signal-to-noise Ratio

An S/N ratio of 58dB (NTSC, PAL-M)/56dB (PAL, SECAM) is possible with BVP-3/30 due to the low output capacitance of the target electrode, combined with a low noise FET with high sensitivity. Excellent circuit performance and an exclusive method of isolating the target electrode from deflection crosstalk make further contribution to improve in S/N ratio.

High Sensitivity

The PbO photoconductive layer used in the BVP-30 pick-up tubes achieves a superior sensitivity of 2000 lux at F4.5. Standard sensitivity of the BVP-3 is 2000 lux F4.0.

Less Registration Error

Improved deflection accuracy provides remarkable reduced registration error. This also contributes to improved luminance resolution in the corners.

Compact, Lightweight and Rugged Construction

The new camera tube technology has enabled Sony to realize an exceptionally compact and lightweight 3-tube color cameras, weighing only 4.3 kg (9.5 lb) without lens. The magnesium diecast alloy frame assures rugged construction.

Automatic Functions

The BVP-3 is furnished with a host of automatic operational features assuring the greatest ease in operation and simple adjustment.

- Automatic Centering
- Automatic White/Black Balance
- Automatic Beam Optimizer
- Automatic Tube Protection Shutter

Viewfinder Indications

To assist the operator, the following viewfinder indications are available.

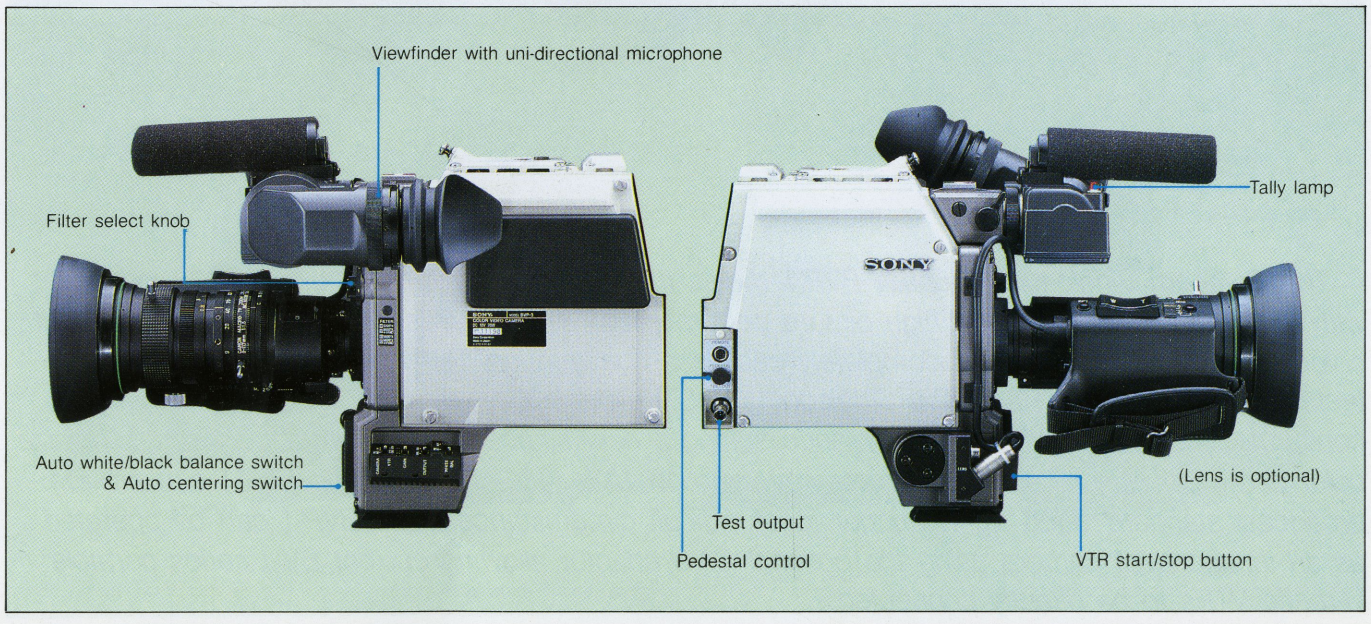
- REC status indicator (red)
- FILTER indicators: 1. 2. 3. 4.
- GAIN indicator
- WHITE/BLACK balance confirmation
- AUTO CENTERING confirmation
- Etc.

CA-30 CCU Interface Adaptor

Using the CA-30 Camera/CCU Adaptor, the BVP-3/30 can be operated as a stand-alone portable camera connected to the standard CCU-300 Camera Control Unit.

Other Features

- 2-line Image Enhancement
- Built-in Uni-directional Microphone
- Shading Compensation for Lens Extender
- Automatic Iris Adjustment Mechanism

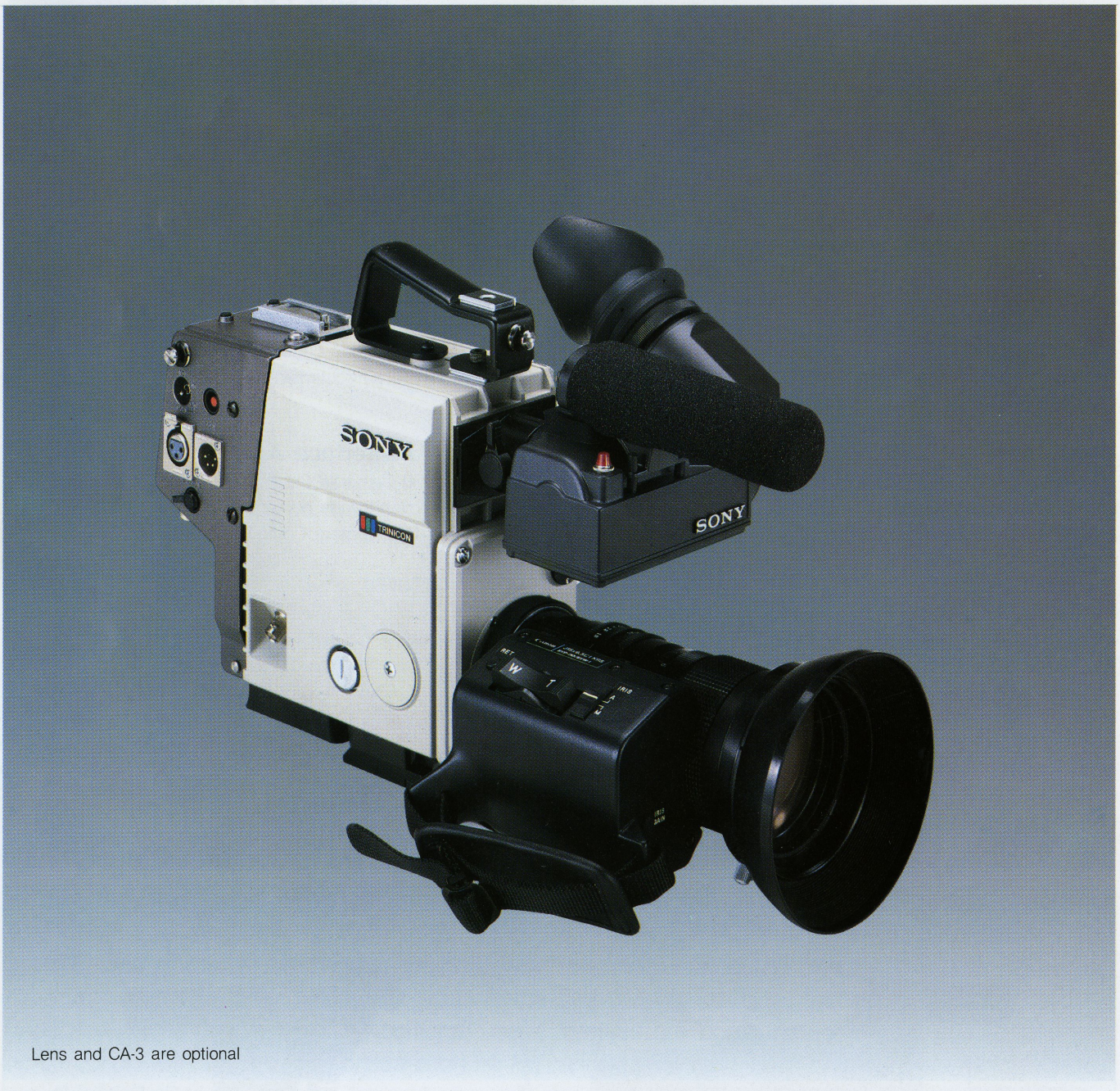


Betacam Camera

Single-tube Camera

BVP-1/1P/1S

(NTSC) (PAL) (SECAM)



Lens and CA-3 are optional

The Betacam Single-tube Camera BVP-1 meets the various requirements of the ENG industry, with full mobility, reliability and high picture performance. The BVP-1 is a lightweight and compact color camera with rugged and completely cableless construction. By exploiting the advanced technology of the High Band SMF Trinicon™ (HBST) pick-up tube, the BVP-1 has low power consumption and high picture performance setting a new standard of performance for smaller size color cameras. Despite very low power consumption 11W (SECAM 12W), the BVP-1 can provide broadcast standard video signals under most difficult circumstances. The BVP-1 can be operated as an independent camera using the optional CA-3 adaptor allowing current BVU series portable U-matic VTRs to be directly connected.

Features

High Quality Picture
Using the HBST tube, horizontal resolution of 400 TV lines can be achieved. Lag characteristics of this tube has been improved by the use of a new type Saticon™ layer and a built-in bias light. S/N ratio of 54dB (NTSC)/53dB (PAL, SECAM) is possible due to a specially designed preamplifier.

Compact and Lightweight
By employing a single high performance pick-up tube, a magnesium diecast frame and high density packaging technology, exceptionally compact and rugged construction has been realized. The complete package weighs only 2.8 kg (6.2 lb) without lens.

Lower Power Consumption
The total power consumption of the BVP-1 has been reduced to 11W (NTSC, PAL)/12W (SECAM). The NP-1 battery accommodated in the BVV-1 allows the BVW-1 combined camera/recorder to be operated continuously for 45 minutes.

Cableless Packaging
Since no cables are required to connect the lens or viewfinder block to the main camera frame, reliability and operating simplicity are both enhanced.

Automatic White Balance
The BVP-1 provides automatic adjustment of white balance and stores its value for each optical filter wheel position. This allows instant and automatic recall of a previous balance if the filter is changed to compensate for variations in lighting conditions.

Preset White Balance (3200°K)
In Preset mode, white balance is factory-set for a 3200°K light source using the Filter 1 position. This mode enables immediate use of the camera both indoors and outside since the operator can commence shooting simply by setting the BVP-1 to the Preset mode in the correct filter wheel position.

Built-in Uni-directional Microphone
The BVP-1 is equipped with a sensitive back electret condenser microphone mounted on the viewfinder block. This microphone can be switched on/off on the BVV-1 recorder.

Viewfinder Indications
Due to the microcomputer based indication system built into the viewfinder block, the following indications are available for efficient and reliable operation: tape remaining, REC status, battery status, FILTER number, GAIN and WHITE balance confirmation.

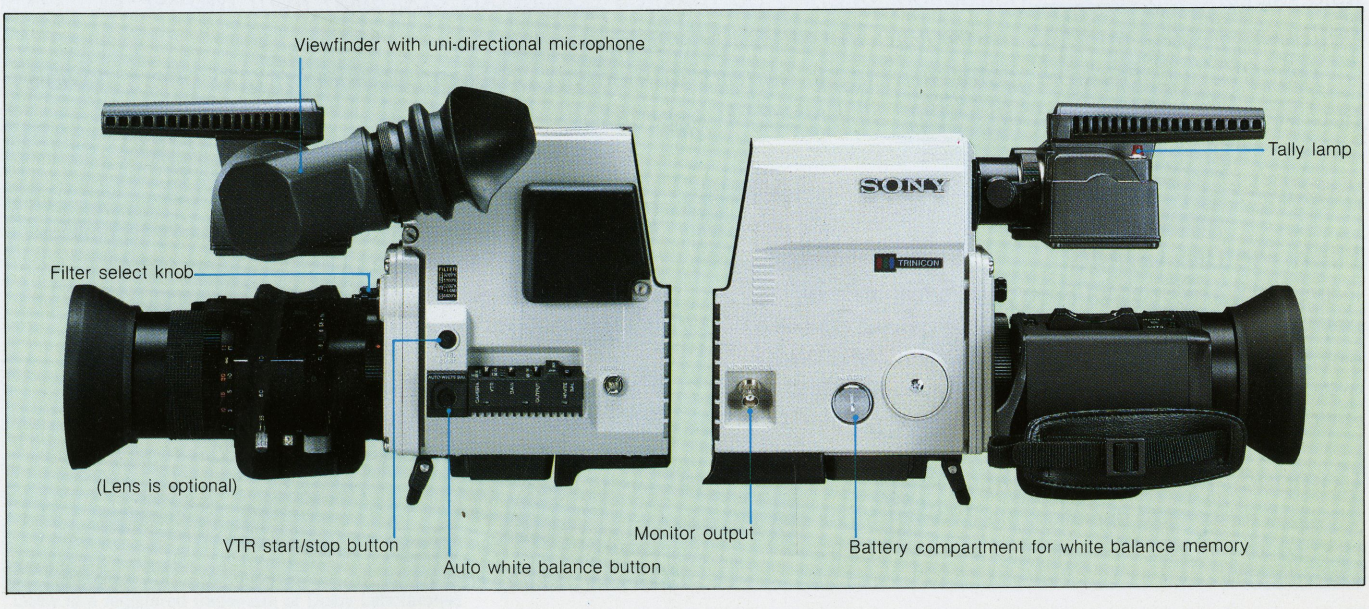
Pick-up Tube Protection Shutter
To prevent damage to the tube, the shutter closes automatically when the camera is switched off.

Automatic Beam Optimizer (A.B.O.)
The A.B.O. allows the BVP-1 to accept excessive light inputs up to about 10 times normal conditions without comet tail or blooming effects.

High Sensitivity
Three position gain switch is provided (0, +6, +12dB selectable) allowing recording under low light conditions.

Encoded Video Output
An encoded composite video output is provided for direct connection to an external monitor.

CA-3 Camera Adaptor
The CA-3 Camera Adaptor, which provides both component and composite video signal outputs, allows the BVP-1 to be operated as an independent stand-alone camera.

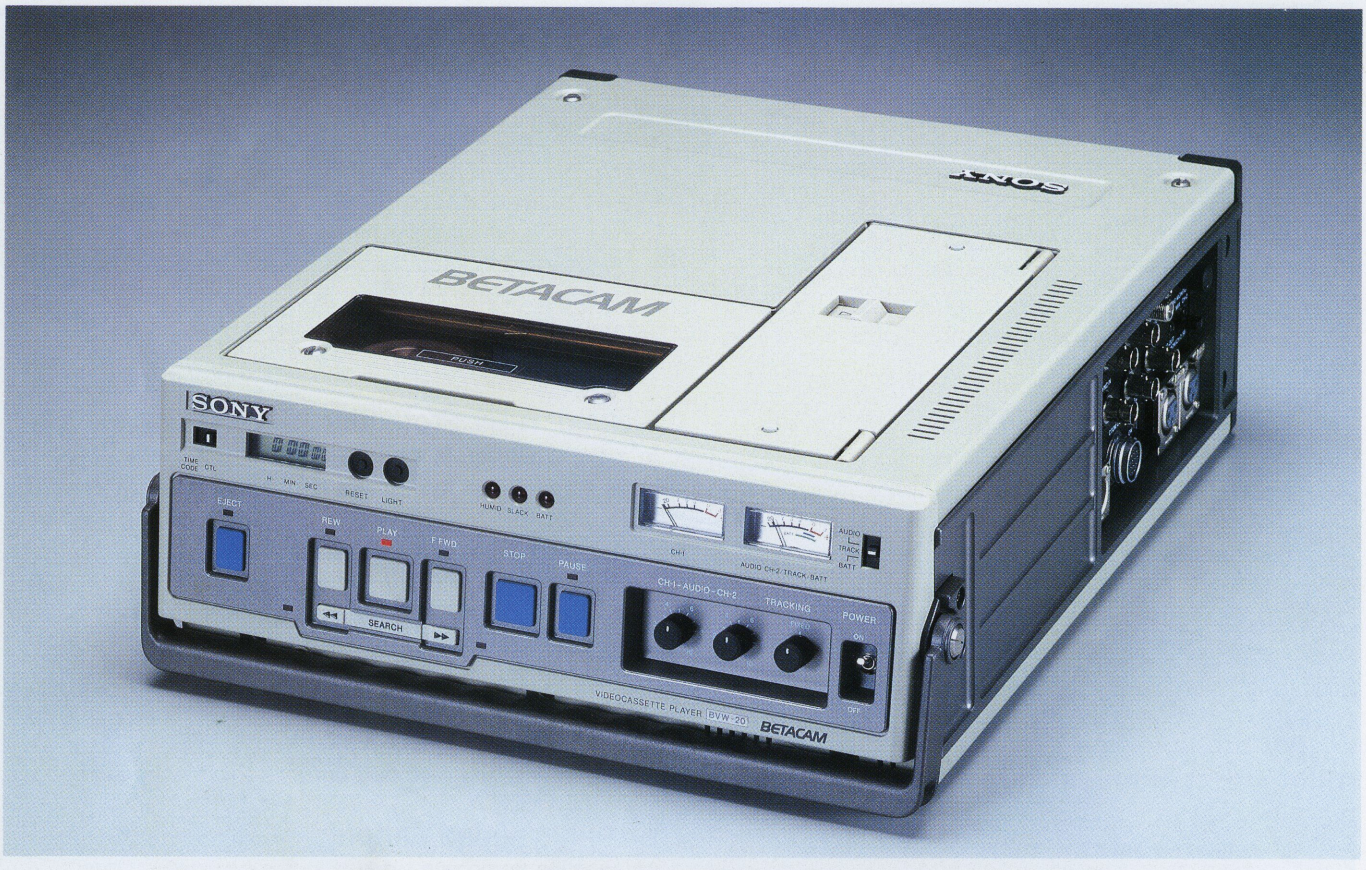


Betacam Portable Player

Betacam Player

BVW-20/20P/20S

(NTSC) (PAL) (SECAM)



The immediate transmission of news has always been a fundamental demand in the ENG industry. Microwave systems have become popular among leading TV stations for the immediate transmission of recorded news from an ENG scene to a base station. Also, for field production, immediate and accurate playback of color pictures is neccessary at the location.

The BVW-20, Betacam Portable Playback VTR, answers these demands. It is a small, lightweight field player of rugged construction, offering 80 minutes continuous operation from two NP-1 batteries. It also enables immediate transmission via an FPU.

The BVW-20 Portable Betacam Player permits immediate program origination and offers flexible and versatile system expansion in all ENG/EFP applications.

Features

High Picture Quality

Incorporating the Betacam Recording Format and new playback circuit technology, the BVW-20 delivers superior picture quality. Through a microwave system, the BVW-20 allows immediate transmission of audio/video signals to a base station.

Compact and Lightweight

Designed for portable operation, the BVW-20 weighs only 8.9 kg (19.6 lb) with two NP-1 batteries and an HG-20 videocassette.

Low Power Consumption

Advanced circuit design and new semiconductor technology allows a battery life of 80 minutes continuous operation from two NP-1 batteries. External AC operation is also possible using AC-500 AC Power Adaptor.

Provision for External TBC

The BVW-20 is provided with external sync and subcarrier inputs for TBC connections. BVT-2000/1000/800 series TBCs can be used.

Built-in Time Code Reader

An SMPTE/EBU time code reader is built into the BVW-20.

A liquid crystal display mounted on the front panel shows either time code or tape time by switch selection.

Direct Drive System

The capstan assembly and supply and take-up reels are driven by direct-coupled brushless motors providing a very stable tape transport system.

Ease of Operation

SWING SEARCH function: Recognizable B/W pictures can be monitored at approximately 3.5 times normal playback speed, either in forward or reverse direction.

LOGICAL CONTROL operation: The logical function control circuit permits smooth and safe operation.

Composite Video Output

Composite video output connectors are provided for connection to other VTRs and monitors.

Dubbing (CTDM) Output

The dubbing connector (luminance and CTDM chrominance outputs) enables dubbing with minimum picture impairment into the BVW-40 Betacam studio VTR through a Dubbing Box (option DB-20 available later).

Warning Indicators

Warning lamps which light or blink warn the operator of condensation, tape slack and battery status.

*Dolby NR System

The BVW-20 is equipped with the Dolby C-type NR system for reduction of audio tape noise.

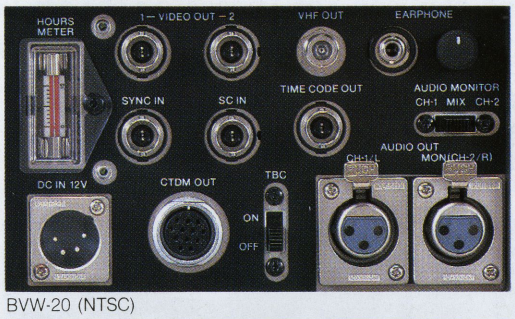
Ease of Service and Maintenance

Main circuit boards are plug-in type. Mounting or removing for service and maintenance is a simple task.

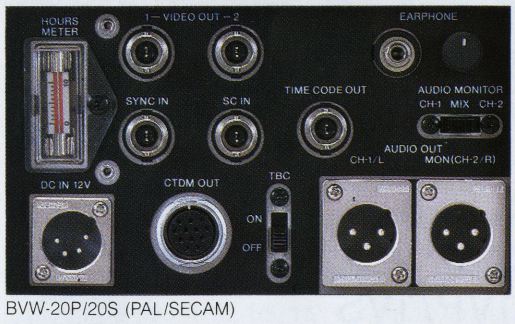
Monitoring with Ordinary TV (NTSC only)

Using the VHF output connector, playback pictures can be monitored on a TV receiver (selectable, USA standard Ch-3 or Ch-4).

Connecting panels

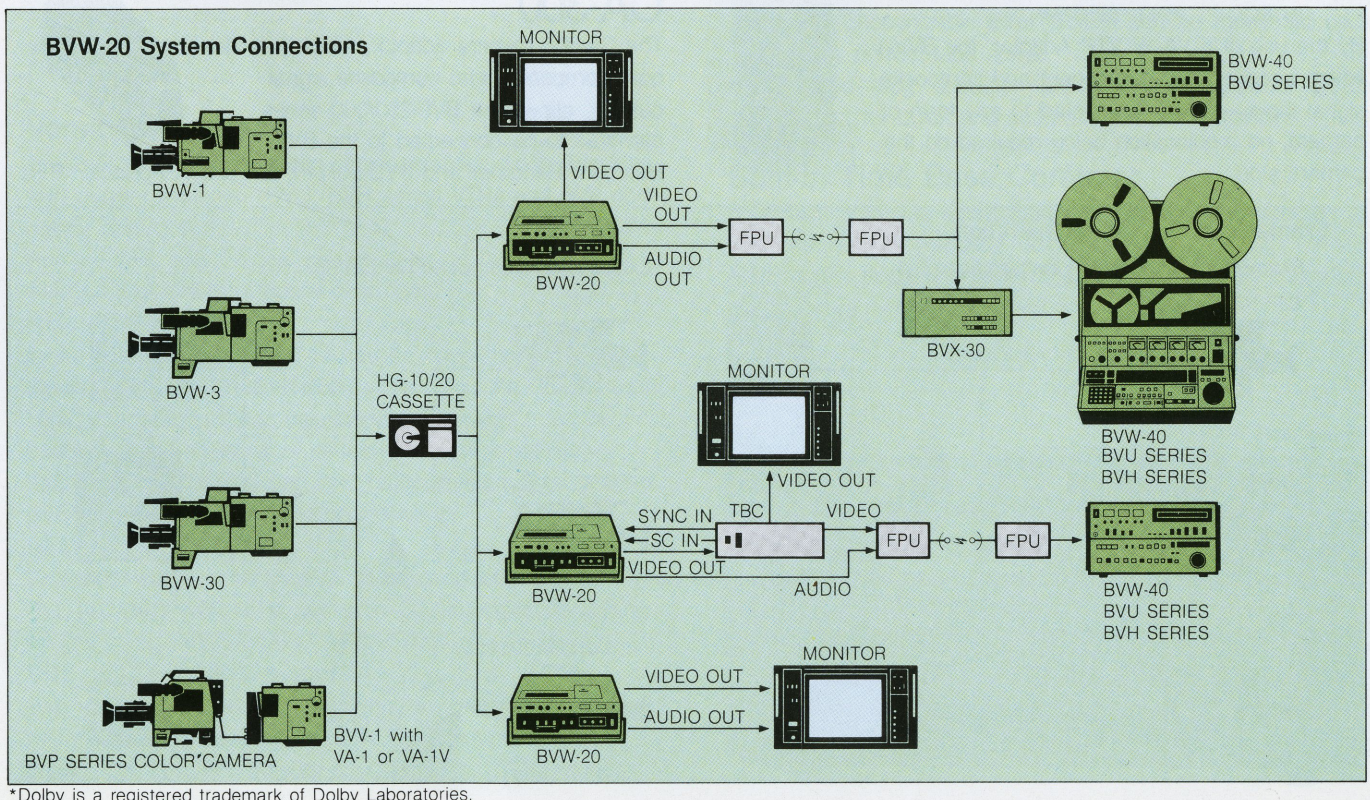


BVW-20 (NTSC)



BVW-20P/20S (PAL/SECAM)

BVW-20 System Connections



*Dolby is a registered trademark of Dolby Laboratories.

Betacam Separated Operation (with optional adaptors)

CA-3/CA-30/CA-300 camera adaptors and VA-1/VA-1V VTR adaptors are available to enable the separate use of Betacam recorder and cameras, and to further expand the Betacam system versatility. Using the adaptors, the BVP-1/3/30 can be used with all current VTRs such as U-matic or BVH series 1-inch C Format. Also, the BVV-1 can be operated as an independent recording VTR connected to all BVP-series cameras.

VTR Adaptors

Component VTR Adaptor

VA-1

Using the VA-1 VTR Adaptor, the BVV-1 can accept component signal inputs from the BVP-1/3/30 Betacam cameras equipped with a CA-3/30 Camera Adaptor or all BVP-series cameras used with a CA-300 Camera Adaptor.

BVV-1 (with VA-1) and conventional portable camera.

Component/Composite VTR Adaptor

VA-1V/1VP/1VS

(NTSC) (PAL) (SECAM)

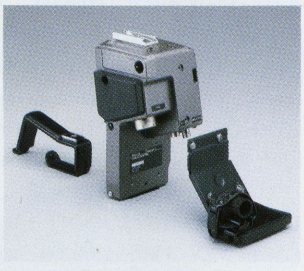
By the use of a VA-1V VTR Adaptor, the BVV-1 which accepts both component and composite signal inputs can be connected to any form of camera, no modification being required on the camera side.

Camera Adaptors

Component/Composite Camera Adaptor

CA-3

The CA-3 Camera Adaptor, which provides both component and composite signal outputs, allows the BVP-1/3/30 to be operated as an independent stand-alone camera. Separate use of Betacam Recorder and Cameras is possible. In addition, all current VTRs can be used with BVP-1/3/30 provided with composite signal output.



Component/Composite Camera-CCU Adaptor

CA-30

The CA-30 is furnished with a 26-pin connector output for both component and composite signals for portable VTRs, in addition to a 41-pin connector output for the CCU-300. Used with the CA-30 Camera-CCU Adaptor, the BVP-3/30 can be connected to the standard CCU-300 Camera Control Unit.

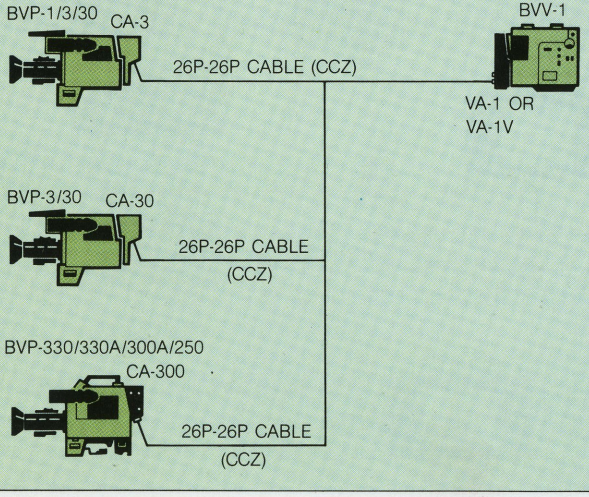
Component/Composite Camera Adaptor

CA-300

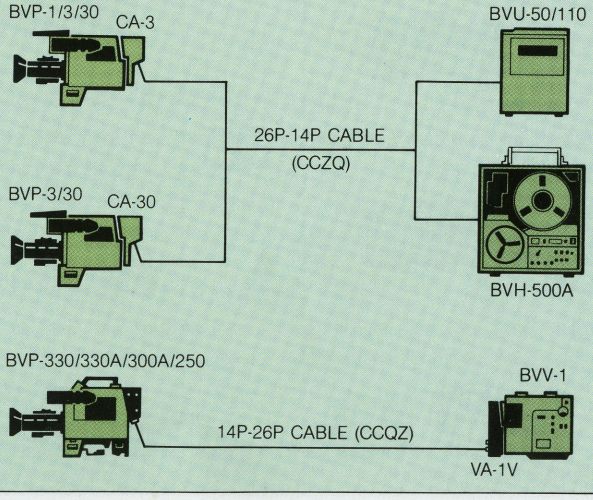
The CA-300 camera adaptor, which provides both component and composite signal outputs, allows the BVP-250/300 series cameras to be connected to the BVV-1 Betacam Recorder and BVU-50/110, BVH-500A Portable VTRs.

Examples of Separated Operation

Example (1) Component Recording



Example (2) Composite Recording



Betacam Studio VTRs

The Betacam system versatility shows in the editing suite as well as on location. For studio operation, a combination of the BVW-40 Editing Recorder/player and the BVW-10 Studio Player provides a complete component signal editing facility which can produce an edited tape with minimal signal impairment from Betacam recorded tapes.

Betacam Studio VTRs also expand system flexibility in current editing facilities. Via an RS-422 9-pin interface, the BVW-10/40 can be used with BVU-800/820/BVH-2000 VTRs and BVE series editing controllers. With built-in TBC, the BVW-10/40 gives broadcast standard video signals.

A Betacam bar-code writer can be connected with the BVW-40 to make bar-code labels. In this way, edited Beta cassettes can be controlled in a Betacam Multi-Cassette System.

With the BVW-10/40 Betacam studio VTRs, Sony provides a speedy and accurate editing capability, while maintaining the high quality picture performance produced by the Betacam recording system.

Betacam Player

BVW-10/10P/10S/10PM

(NTSC) (PAL) (SECAM) (PAL-M)

Features

Versatile Interface

The BVW-10 Betacam studio player provides direct interface with current systems—BVU, BVH series VTRs and BVE series editing control units.

Remote 1/Remote 2/Local can be selected by a front panel switch for a variety of operational control.

REMOTE 1

In the Remote 1, the BVW-10 can be connected with the BVW-40/BVU-800/820/BVH-2000 VTRs using the RS-422 9-pin serial interface, and can be remotely controlled from the front panel of these VTRs, all of which have built in editing functions. The BVW-10 can also be connected directly to BVE-800/3000A/5000 editing control units.

REMOTE 2

Remote 2 enables the BVW-10 to be connected with BVU-200/BVH-1100 VTRs by 36-pin CCJ interface via editing control units, BVE-500A/800/3000A/5000.

DUB or COMPOSITE output

Two kinds of dub output connectors are provided in addition to two composite video outputs. One DUB output connector provides Y, R-Y, B-Y outputs or Y, R-Y/B-Y (CTDM mode) outputs for component editing with a BVW-40. This provides the highest possible dubbing quality. The other is employed for dubbing into current BVU series U-matic machines.

Ease of Operation

Front access and 19-inch rack mounting

The BVW-10 can be installed in 19-inch EIA standard racks and its control panel can be tilted for easy operation.

8-digit LED display

Either Time Code or tape time can be selected for display by a front panel switch.

BIDIREX SEARCH dial

Shuttle/Jog/Still modes are provided by the search control.

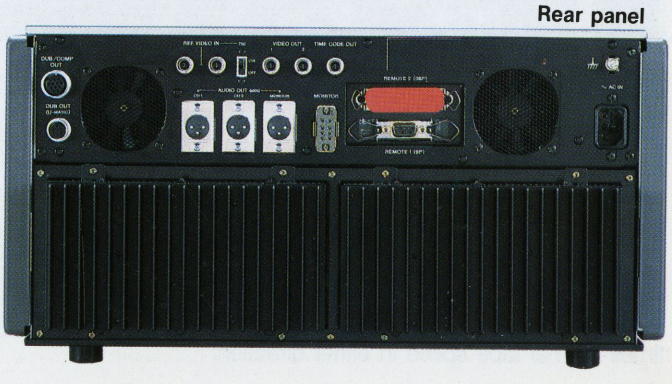
- Shuttle mode—The tape speed can be varied from 1/30 to 10 times normal in both forward and reverse directions in 16 steps (±1/30, 1/10, 1/5, 1/2, 1, 2, 5, 10 times) all with viewable pictures. Recognizable color picture can be monitored up to ±5 times normal tape speed.
- Jog mode—Jog operation provides frame-by-frame picture movement for quick and accurate edit point location.

Built-in Time Base Corrector

Broadcast standard video signals can be obtained directly from the BVW-10 without an external TBC.

Advanced high quality digital dropout compensation ensures consistent picture performance.

Rear panel



Betacam Studio VTRs

Betacam Recorder

BVW-40/40P/40S

(NTSC) (PAL) (SECAM)

Features

Built-in Editing

The BVW-40 provides a built-in editor to expand system flexibility and versatility. A BVU-800/820 or BVH-2000 can be remotely controlled from the function panel via an RS-422 9-pin cable interface. An independent Insert Edit function for Video, Audio 1, Audio 2, and Time Code as well as an Assemble Edit function with auto Preview/Review are provided. The BVW-40 meets the requirements of a modern editing system, having frame-by-frame forward or reverse trim, selectable pre-roll time, and auto edit in/out functions delivering high editing accuracy without any additional control hardware.

High Speed Picture Search

BIDIREX SHUTTLE function

A color picture can be obtained up to 5 times (10 times monochrome) normal tape speed in both forward and reverse directions. Using the search dial incorporated in the BVW-40, shuttle speed can be varied at 1/30, 1/10, 1/5, 1, 2, 5 or 10 times normal tape speed in either direction.

JOG function

In the Jog mode, tape movement accurately follows the rotation of the search dial in both directions, moving one frame for each revolution of the dial.

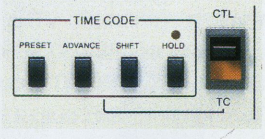
Time Code

INDEPENDENT TIME CODE track

In order to meet the demand for time code editing or time code re-insertion, the Betacam Format provides a dedicated longitudinal Time Code Track in addition to Audio 1/2 and CTL tracks. Using the built-in Time Code Generator/reader, editing flexibility and accuracy of the BVW-40 are enhanced. Re-insertion of Time Code is possible by the use of front panel controls.

Built-in TIME CODE GENERATOR/READER

An SMPTE/EBU Time Code Generator/reader is provided in the BVW-40. Time code setting can be executed easily using push buttons on the front control panel. Selection of external/internal time code in, Regen/Preset and Rec-Run/Free-Run can also be controlled by switches on the Time



Code Board.

Versatile System Interface

RS-422 serial interface (9-pin)

An RS-422 serial interface is provided for versatile editing system expansion and flexible system control. The BVW-40 can be directly interfaced to another BVW-10/40, BVH-2000 1-inch VTR, BVU-800/820 U-matic and BVE-800/3000A/5000 editing controllers.

36-PIN parallel interface

A 36-pin parallel interface is also provided for simpler remote control applications. A combination of the BVE-500/BVU-200 VTR or a BVR-510A Remote Controller can be connected directly to the BVW-40 Betacam.

DUB OUT connection (7-pin)

The Dub Out connector permits direct dubbing into the BVU U-matic format. Specially designed circuits permit edit or duplication with little picture impairment.

DUB/COMPONENT connections (12-pin)

Using the Y/R-Y/B-Y component signals or CTDM signal inputs/outputs provided, the superior picture quality produced by the Betacam recording system is maintained.

Audio System

2-channel audio mixer

The BVW-40 is equipped with a simple audio mixer operating on channels 1 and 2. In the record mode, two inputs may be selected for separate channel recording or for mixed recording on either channel 1 or 2. Separate record and playback level controls are provided on the front panel.

Noise reduction system

Dolby C-type noise reduction system is provided to improve audio performance, and an ON/OFF selector is included.

Playback audio mixing

Low impedance audio monitor output which may be selected for separate or mixed output is provided on the rear connector panel.

Built-in Time Base Corrector

Standard broadcast video output can be obtained directly from the BVW-40, no additional time base corrector being required. Advanced high quality digital dropout compensation also ensures consistent high picture performance.

Easy Installation

19-inch rack mountable

The BVW-40 can be installed in 19-inch EIA standard racks and consoles in studio or OB vehicles.

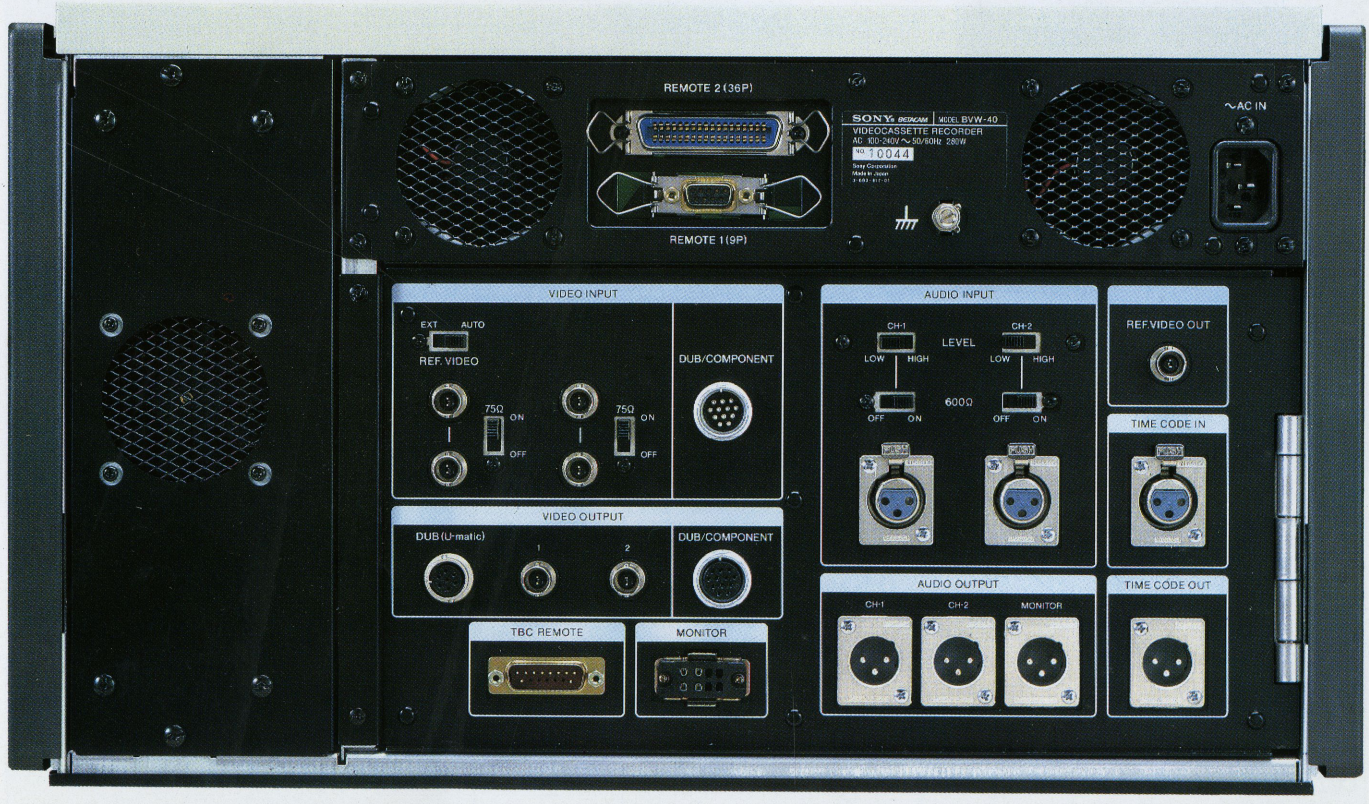
Front loading

All operational functions including tape cassette insertion are front accessed.

Hinged/detachable front panel

The front control panel can be tilted up to 90 degrees according to the personal preference of the operator. The front panel can also be detached to meet different operational and mounting requirements.

Rear panel

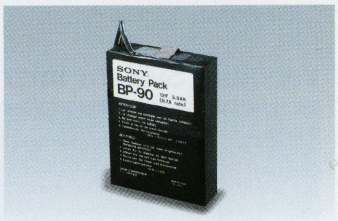


Optional Accessories for Betacam

AC-500/500CE
AC adaptor

BC-1WA/1WACE
Battery charger for NP-1 (up to four NP-1s)

BC-210/210CE
Battery charger for BP-90 (up to four BP-90s)



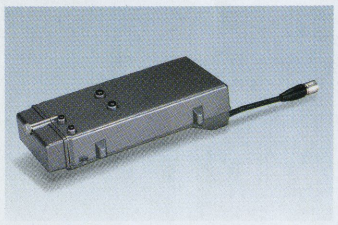
BP-90
NiCd rechargeable battery

NP-1
NiCd rechargeable battery

BVF-50/50CE
5-inch B/W viewfinder

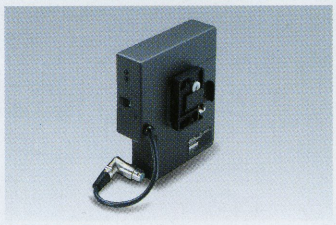
***CCU-300/300P/300PM**
Camera control unit

***DCU-300/300P/300PM**
Digital command unit



DC-100
Battery case for NP-1

DC-210
Battery case for BP-90



DC-300
Battery case for BP-90

DC-310
Battery case for NP-1 (up to two NP-1s)

*SECAM version of CCU-300/DCU-300 is available using BK-303/305 conversion kit.

RM-P3
Camera remote control unit

Combination charts for optional accessories

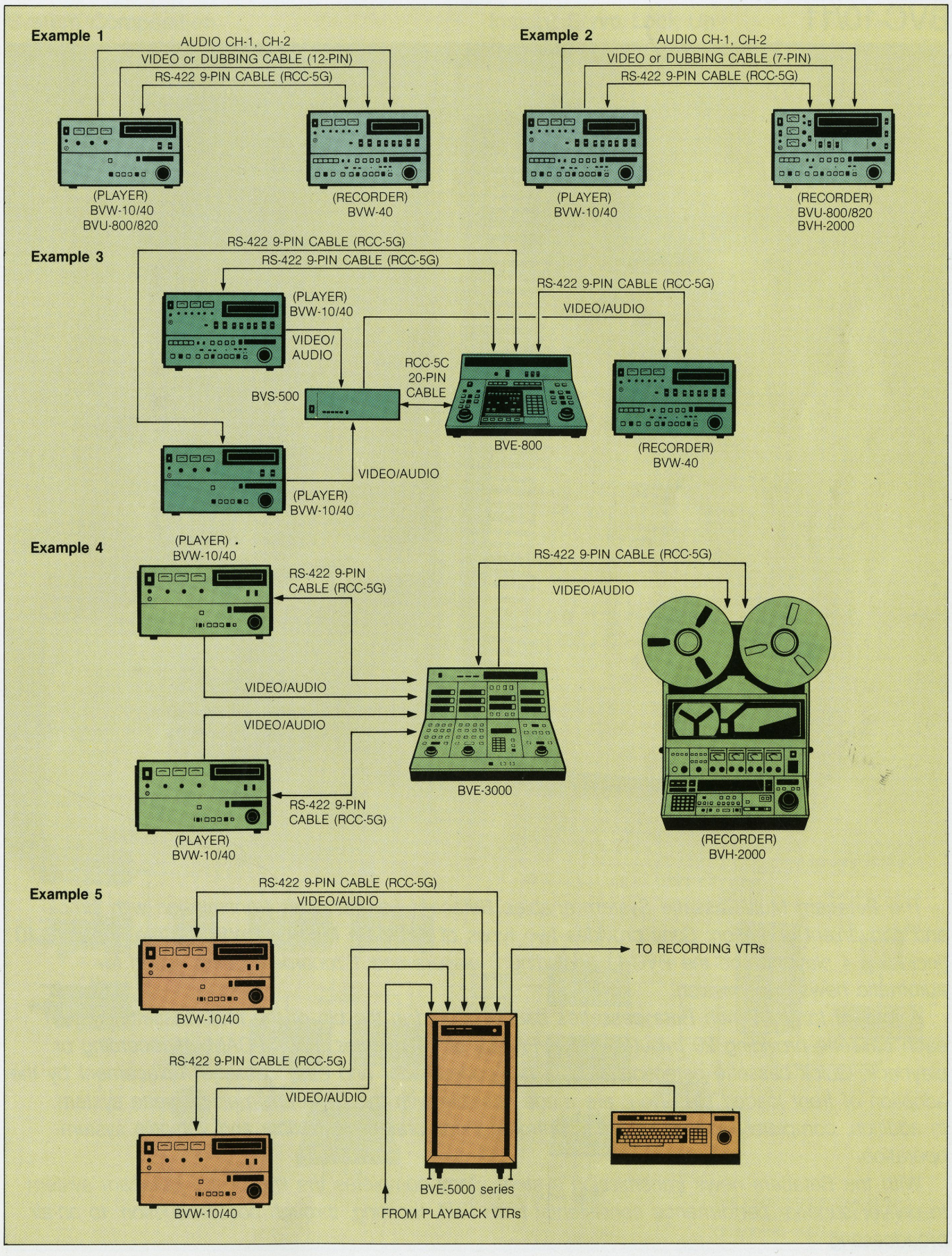
		Camera adaptor			Camera	Betacam recorder
		CA-3	CA-30	CA-300	BVP-250/300A/330/330A	BVV-1
Battery case for NP-1	DC-100	—	—	—	—	○
	DC-310	○	○	○	○	—
Battery case for BP-90	DC-210	○	○	○	○	○
	DC-300	○	○	○	○	—

	VA-1 VA-1V	BVH-500A BVU-50/110	BVP-1/3/30 with CA-3, CA-30	BVP-250/300A 330A with CA-300	BVP-110/250 300A 330A
CCQ-cable 14—14-pin	—	○	—	—	○
CCQZ-cable 14—26-pin	○ (VA-1V only)	—	—	—	○
CCZQ-cable 26—14-pin	—	○	○	—	—
CCZ-cable 26—26-pin	○	—	○	○	—

Optional accessories for BVW-10/40

- BK-805 : Rack mount kit
- HG-5CL : Cleaning cassette
- RMM-100 : Rack mount kit
- VDC-5 : Dubbing cable (5m)
- RCC-5G : 9-pin remote cable
  RCC-5G : 5 (m)
  RCC-10G : 10 (m)
  RCC-30G : 30 (m)

Typical Connections for Betacam VTRs



Betacam Multi-Cassette System (Preliminary)

Betacam Multi-cassette System

BVC-10/11

*Desk is optional

The Betacam Multi-Cassette System enables Betacam Format news transmission with simple and convenient operation. Sony provides two types of Betacam Multi-Cassette System, the BVC-10 (including 4 players) and the BVC-11 (including 3 players and 1 recorder) ideally suited for automatic news transmission.

A total of forty 1/2-inch Beta cassettes can be stored in the bin of the multi-cassette system, each cassette providing 20 minutes (NTSC/PAL-M) or 24 minutes (PAL/SECAM) of recording or playback. Quick cassette detection using a bar code reader and easy cassette replacement by the adoption of front loaded bin layout are made possible with the Betacam multi-cassette system. In addition, completely software based control is incorporated for flexible and versatile system operation.

With the Betacam news transmission system, Sony completes the line of the Betacam system to deliver superior performance consistently from field shooting, through post-production, to on-air broadcasting.

System Composition

1 BVC-10 (Main unit, BVS-500 switcher, Bar code reader, Floppydisk ×2, BVW-11 Betacam player×4)
2 BVC-11 (Main unit, BVS-500 switcher, Bar code reader, Floppydisk×2, BVW-11 Betacam player×3, BVW-41 Betacam player/recorder)

Optional Equipment

1 BVR-11 Remote Control Unit (with CRT Display)
2 BVR-12 Simple Remote Control Unit
3 BVBC-10 Bar Code Writer
4 Bar Code Printer
5 BVW-11 Player
6 BVW-41 Player/Recorder
7 Matrix Switcher

Features

Format Compatibility

By the adoption of the Betacam recording format, Betacam Multi-Cassette System has complete format compatibility with Betacam studio VTRs to provide superior picture performance.

Maximum 40 Cassettes Storage

The BVC-10/11 Betacam Multi-Cassette System is able to store max. 40 cassettes of Beta 1/2-inch HG-10/20, each cassette providing 20 minutes of recording and playback on NTSC/PAL-M models or 24 minutes on PAL/SECAM models.

Still Field Playback

Noiseless playback at still mode is possible using Sony's advanced DT technology with the BVW-11 and BVW-41 Betacam VTRs. This, combined with the instant servo lock up ability enables immediate picture identification.

Instant Servo Lock Up

Servo lock up time of 0.3 seconds is achieved by the use of precise mechanism and advanced servo circuit design.

Short Access Time

10 sec. playback for each VTR is possible in sequential playback with 4 VTRs. For 3 VTRs, this is 15 seconds. (Same duration with each VTR)

Bar Code Cassette Identification

All necessary information for automatic operation can be read out by the bar code reader built into the cassette transport elevator. A bar code label made with an optional bar code writer is put on the Beta cassette.

Stereo Audio Capability

Two channels of audio output are available with the Betacam Format. Audio noise reduction system is built into the BVW-11/41 for better audio quality.

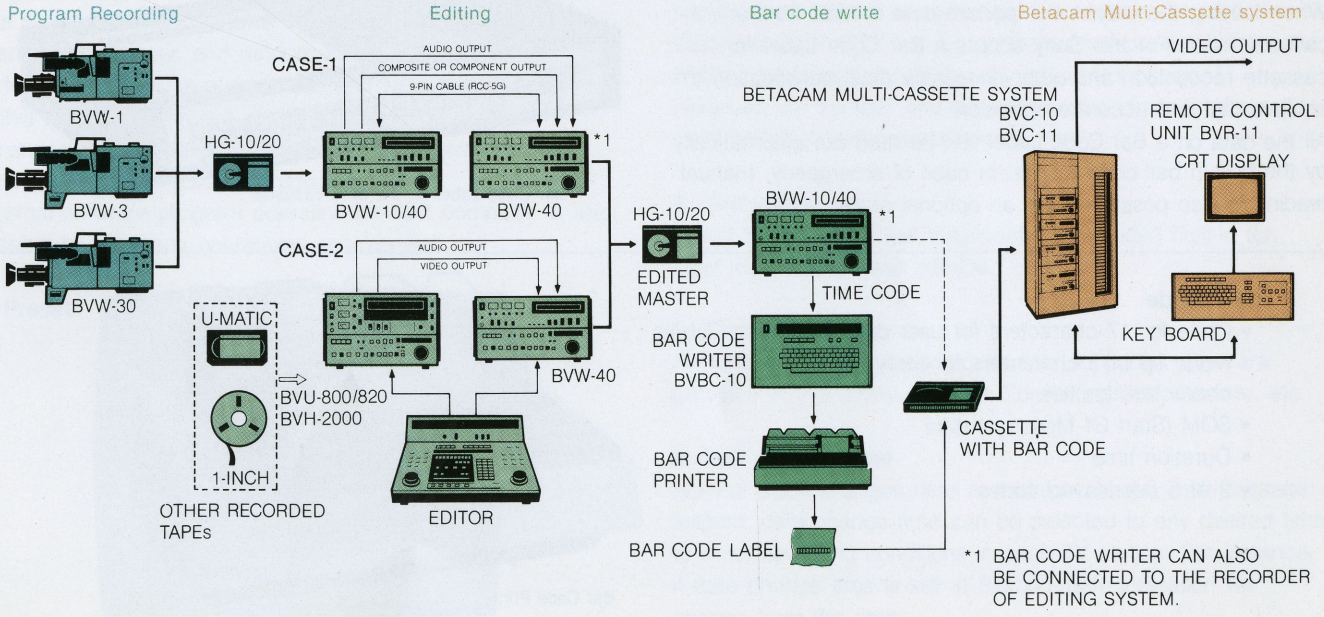
Matrix Switcher (option)

Equipped with a matrix switcher for 4 audio/video inputs and outputs, the Betacam Multi-Cassette System provides flexible news transmission. Any combination of audio/video inputs and outputs can be remotely controlled from the BVR-11 remote control unit.

Random Access Capability

The Betacam Multi-Cassette System provides rapid random access to up to 40 cassettes of video tape material.
The built-in bar code reader/controller detects bar code information and select the cassettes according to the programmed playback sequence from any slot of the bin. By

Betacam System Operation



Betacam Multi-Cassette System

the use of a BVR-11 Keyboard, playback sequence can be changed immediately, if necessary, no cassette re-insertion being required.
In case of emergency, manual bar code reading is also possible and the cassette can be directly inserted into the BVW-11 for continuous operation. The BVC-10/11 is equipped with two floppydisks to store bar code data and other necessary information for multi-cassette operation.

Play List File

Up to 50 programs of play list can be stored into the built-in floppydisks.

Various System Connections

In addition to the incorporated bar code reading ability, the Betacam Multi-Cassette System is capable of accepting host computer input and other external command for a wide range of studio operations.

Multiple Operation

Sequential or back-up multi-cassette playback is possible using several Betacam Multi-Cassette Systems.

Non Volatile ICs

The use of non volatile ICs allows system presets to be easily made from the keyboard through menu-like selection of variables, rather than using mechanical DIP switches. These settings are retained in memory even if power is turned off.

Built-in Recording Facility

The BVC-11 contains one player/recorder BVW-41 in the rack to provide recording capability.

Bar Code Writer

BVBC-10 (option)

Keyboard

- 40 character fluorescent tube display
- Story number and title are entered via a full keyboard
- SOM (Start Of Message) and EOM (End Of Message) materials are determined by a single key stroke used with a jog knob on the BVW-10/40.
- Duration of program is automatically calculated by entering SOM/EOM points
- Print out of commands

Time Code

- Time code reader is built into the BVBC-10 for determination of SOM and EOM points.
- Standard RS-232C is provided for bar code printer.

Bar Code System

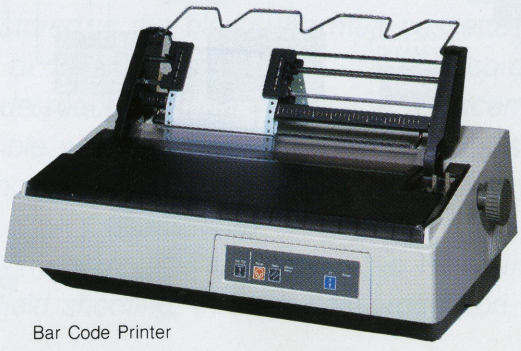
Cassette Label

When loading the machine important data is read from a cassette label. For this Sony adopts a Bar Code Label for cassette recognition and other necessary data identification to achieve fast and accurate operation.
All the data on a Bar Code Label can be read out automatically by the built-in bar code reader. In case of emergency, manual reading is also possible using an optional reader.

Bar Code Label on the Beta cassette

Bar Code

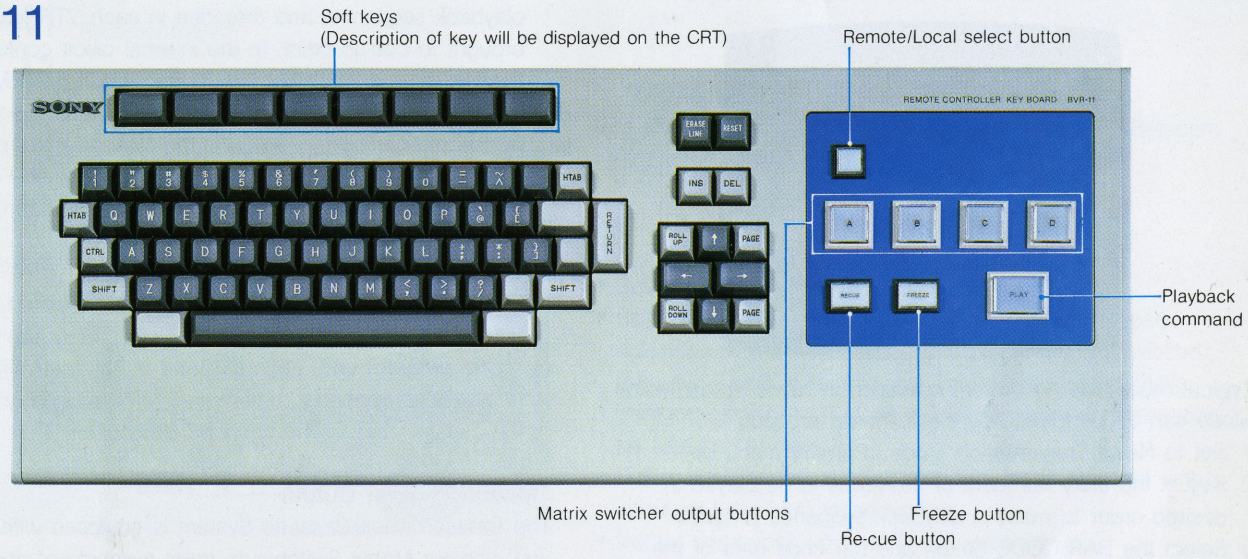
- Code for 17 characters for user defined cassette labels made up of 3 characters for story number and 14 characters for title.
- SOM (Start Of Message) data
- Duration time
- 2 of 5 interleaved codes



Bar Code Printer

Simple Remote Control Unit

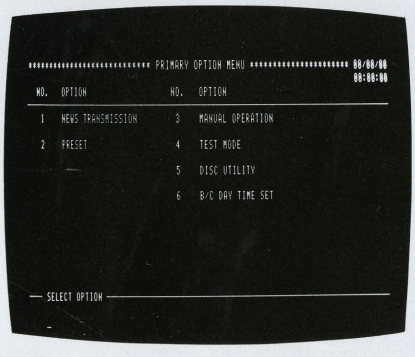
BVR-11



BVR-11 and System Operations

Primary Option Menu

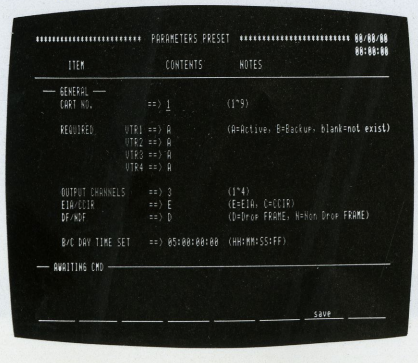
The built-in microcomputer of the Betacam Multi-Cassette System contains the following 6 options in the primary menu for various operations and machine setup.



1. News transmission

This is used for normal news transmission or spot playback operation. Automatic and random access operation is performed by the use of bar code and simple key operation. In this mode, all software programs required for news transmission is contained. In addition, data correction and entry using the keyboard are possible.
External software program operation by host computer is also possible to meet any operational requirement.

2. Preset



When initially installing a multi-cassette system, all necessary operation data must be input to meet conditions of each TV station setup. Major preset modes are:

- VTR select (active or back up)
- Program output total channel select
- EIA/CCIR select
- Drop frame/non drop frame select
- Elevator preload mode select
- Synchronization mode select
- Preroll time/synchronization preroll time setting
- Baud rate select/parity, etc for a printer
- Etc.

3. Manual operation

In addition to automatic news transmission mode, the system contains manual operation mode. In this mode, manual control transmission without bar code data is possible for particular situations. Each VTR can be controlled independently from the BVR-11 Keyboard and CRT or by its control panel.
However, bin number and program output channel information must be input from the keyboard.

4. Test mode

Circuit board based self diagnostics is provided built-in for easy maintenance and service.

5. Disk utility

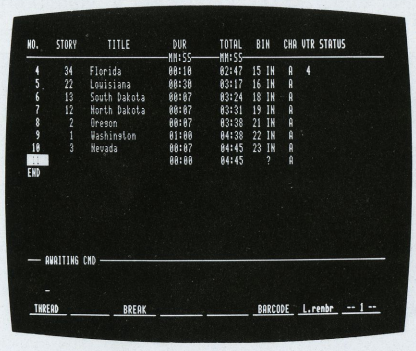
All necessary commands required for floppydisk drive are provided in this mode, such as Formatting/Copy/Restore, etc.

6. B/C day time set

Normal clock changes date at midnight. In this multi-cassette system, date change time can be selected to any desired time to meet operating conditions in each TV station. For instance, if date change time is set at 5:00:00, date indication will change from the time.

Betacam Multi-Cassette System

Operation in News Transmission Mode

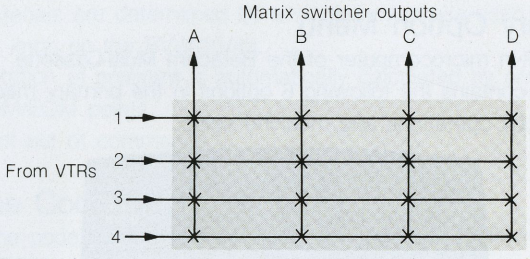

NO. STORY TITLE DUR TOTAL BIN CHA VTR STATUS
MM:SS MM:SS
4 34 Florida 00:10 02:47 15 IN A 4
5 22 Louisiana 00:30 03:17 16 IN A
6 13 South Dakota 00:07 03:24 18 IN A
7 12 North Dakota 00:07 03:31 19 IN A
8 2 Oregon 00:07 03:38 21 IN A
9 1 Washington 01:00 04:38 22 IN A
10 3 Nevada 00:07 04:45 23 IN A
00:00 04:45 ? A
END
AWAITING CMD
THREAD BREAK BARCODE L.remhr -- | --

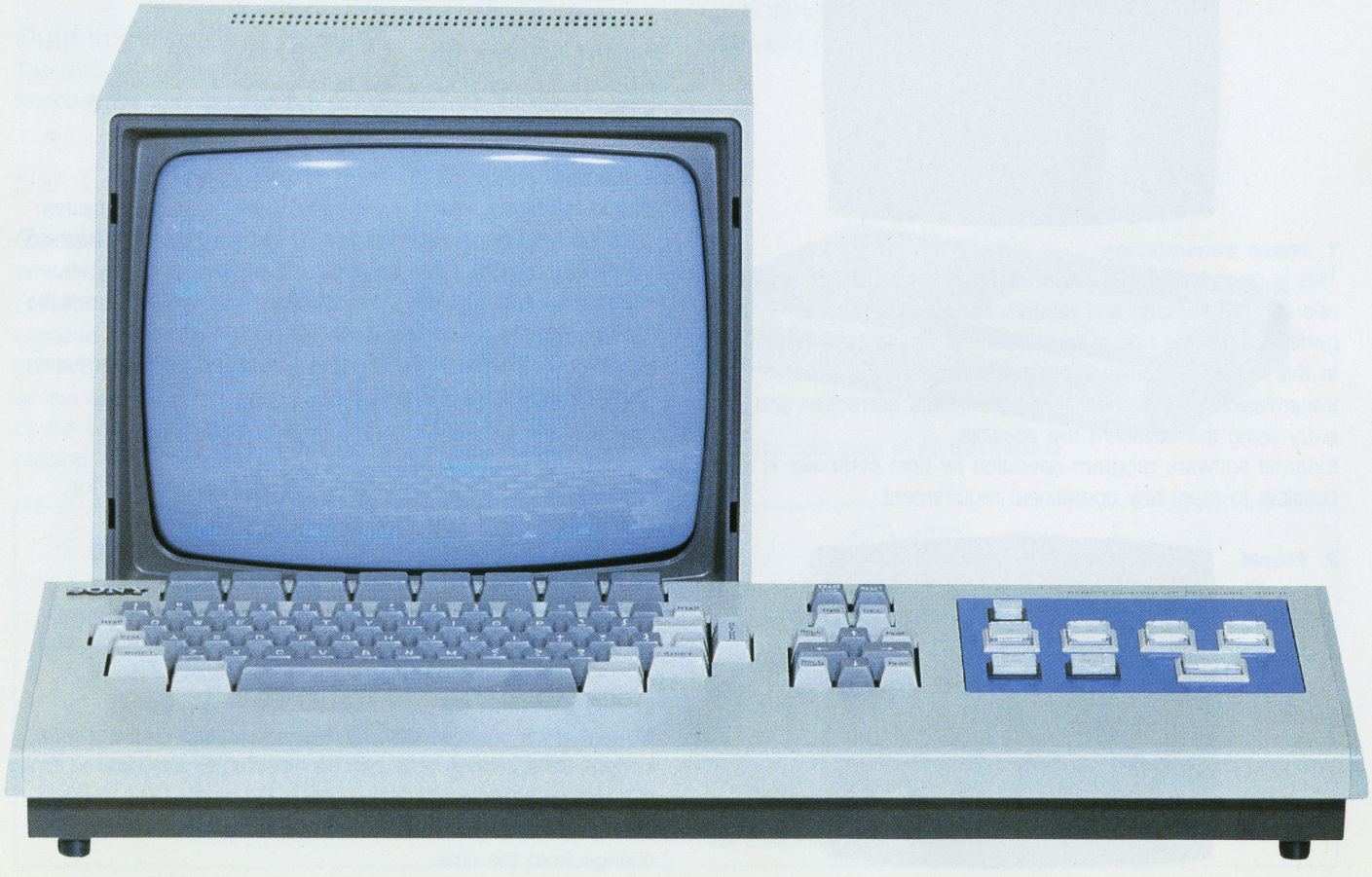
Typical multi-cassette system operation in News Transmission Mode can be performed by the following procedure.

1 Set to News Transmission Mode. (Primary menu option 1)
2 Key in the story numbers of cassettes to be played in desired order to make a playback sequence program.
3 Select the BAR CODE button and bar code data of the cassettes is read by the built-in bar code reader incorporated in the cassette elevator. All necessary information on the label of each specified cassette is displayed on the CRT.
   At this time, the system automatically selects output channel "A". However, using the BREAK soft key, output channel A, B, C, D can be used. Break time between cassettes can also be set using the BREAK soft key.
4 After confirmation of all data from CRT press THREAD soft key and cassettes are loaded based on the programmed playback sequence, and threaded in each VTR which will be brought to cue-up point. In the internal clock control mode, the system automatically threads tapes for standby.
5 Push desired output channel buttons (A, B, C, D, selectable) on the remote control unit and the system starts playback according to the program sequence. In the mode of internal/external clock operation, the system automatically starts.
   Using the BVR-12 simple remote controller, PLAY/RECUE/FREEZE functions can be controlled from the master control room.
6 At the program end, each cassette is automatically rewound to the SOM point then unthreaded, ejected and returned to the cassette bin by the cassette elevator.

***Matrix Switcher Output**

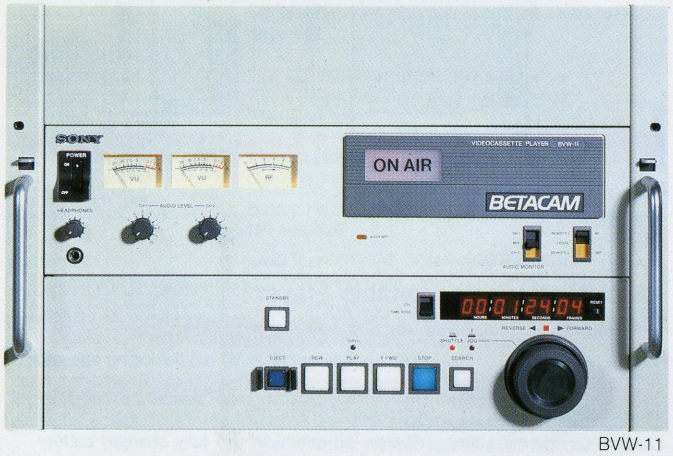
The Betacam Multi-Cassette System is equipped with a 4-input and 4-output Matrix Switcher to meet a variety of operational requirements.





Betacam VTR

BVW-41 Recorder/Player
BVW-11 Player



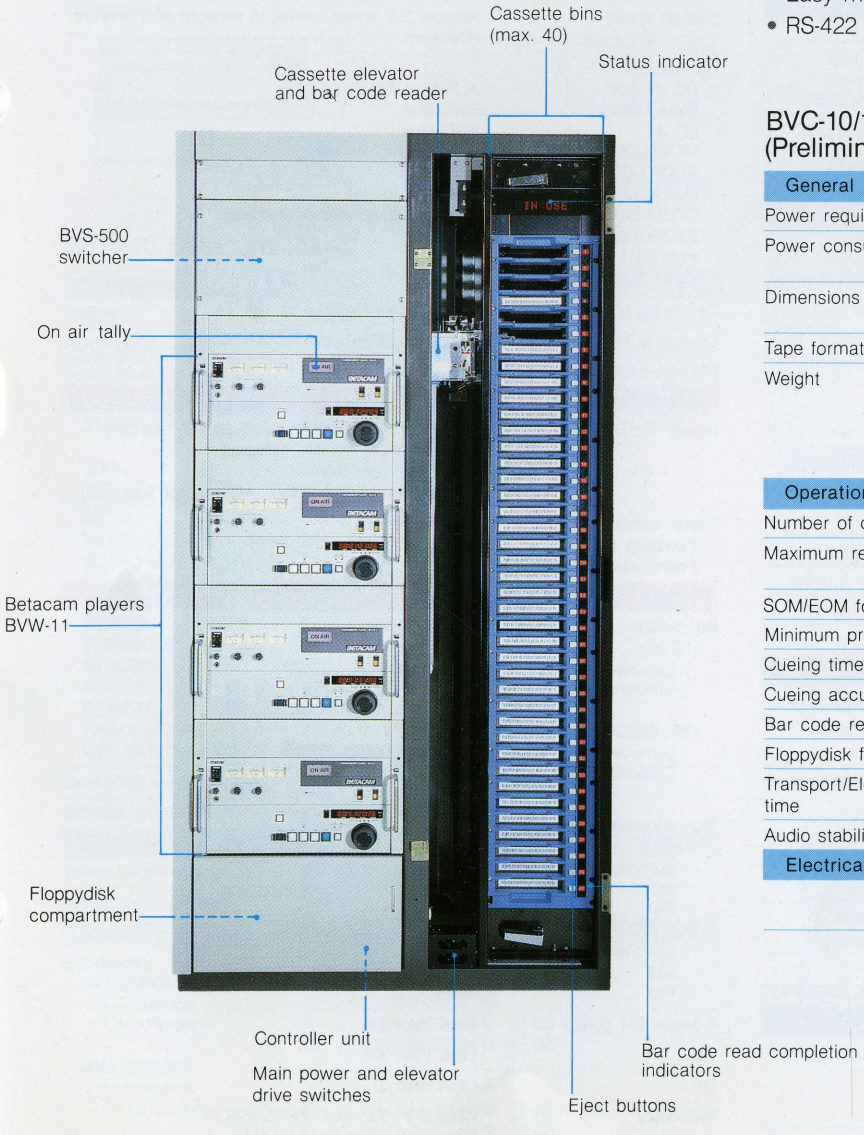
BVW-11

The BVW-41/11 Betacam VTRs are installed in the Betacam Multi-Cassette System for On-Air transmission.

Features

- Side-loading cassette system
- Still field playback and −1 to +3 times normal speed noiseless playback are possible employing the advanced Dynamic Tracking technology. The adoption of an 8-bit microprocessor in DT drive circuits ensures compensation for Bimorph hysteresis.
- Built-in time base corrector provides the BVW-41/11 with standard broadcast video signals.
- Instant servo lock up time of 0.3 seconds
- Full local operating capability
- Easy maintenance with plug-in circuit boards
- RS-422 I/O port for flexible system expansion

Layout of Multi-Cassette System (BVC-10)



BVC-10/11 Betacam Multi-Cassette System (Preliminary specifications)

General	
Power requirements	AC 90 to 265V, 48 to 64Hz
Power consumption	BVC-10: Approx. 1.6kVA BVC-11: Approx. 1.7kVA
Dimensions	Approx. 1025(W)×2050(H)×710(D)mm (40.4×80.7×28")
Tape format	Betacam format
Weight	Approx. 320 kg (w/o VTRs, includes Matrix switcher, Controller) Approx. 460 kg (Includes BVW-11×4, Matrix switcher, Controller)
Operational	
Number of cassette bins	40
Maximum record time (BVW-41)	NTSC: 20 min. PAL: 24 min.
SOM/EOM format	SMPTE/EBU time code
Minimum preroll time	Selectable
Cueing time (best case)	Typical 3 sec.
Cueing accuracy	±1 frame
Bar code read time	1.5 sec. (typical)
Floppydisk format	BVC-10/11 format
Transport/Elevator cycle time	20 sec. (typical)
Audio stabilization time	0.3 sec.
Electrical	
	See specifications of BVW-10 series and BVW-40 series.

Betacam Specifications

Betacam Format Specifications

	525/60 system	625/50 system
Tape speed	11.86cm/sec	10.15cm/sec
Writing speed	6.9m/sec	5.7m/sec
REC/PB time with an HG-20 cassette	20 minutes	24 minutes
Tape	1/2-inch videocassette HG-10/20 or equivalent	

BVV-1 Betacam Recorder

Mechanical	
Weight	Approx. 3.4 kg (7 lb 8 oz)
Wow/flutter	Less than 0.15% rms (with standard playback machine)
Continuous recording time	Approx. 45 minutes with fully charged NP-1 battery pack with BVP-1
Operating temperature	0°C to +40°C (32°F to 104°F)
Operating humidity	Less than 80% (relative humidity)
Storage temperature	−20°C to +60°C (−4°F to +140°F)
Operating position	Horizontal or vertical
Connectors	
CAMERA	50-pin
AUDIO IN CH-1/CH-2	XLR type 3-pin (female)
EARPHONE	Mini jack
DC 1N 12V	XLR type 4-pin

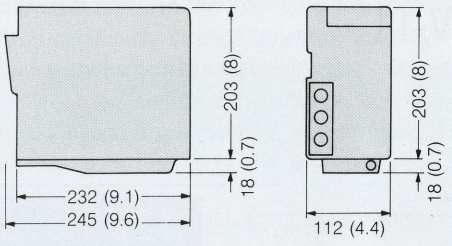
Electrical	
Power requirements	DC 12V (11.5V to 14V) Using the NP-1 battery pack (NiCd, 1.5 Ah, optional) AC power can also be supplied using AC-500/CE AC power adaptor (optional)
Power consumption	10W (12V, 830mA) 2.4W in power save mode

Video	
Input	
Luminance	1.0Vp-p, 1k ohms unbalanced
Chrominance	R−Y: 0.7Vp-p, 1k ohms, unbalanced B−Y: 0.7Vp-p, 1k ohms, unbalanced
Sync	5.0Vp-p (TTL level)
Bandwidth	
(NTSC)	
Luminance	30Hz to 4.1MHz $^{+0.5}_{-6.0}$ dB
Chrominance	R−Y: 30Hz to 1.5MHz $^{+0.5}_{-3.0}$ dB B−Y: 30Hz to 1.5MHz $^{+0.5}_{-3.0}$ dB
(PAL/SECAM)	
Luminance	25Hz to 4.0MHz $^{+0.5}_{-6.0}$ dB
Chrominance	R−Y: 25Hz to 1.5MHz $^{+0.5}_{-3.0}$ dB B−Y: 25Hz to 1.5MHz $^{+0.5}_{-3.0}$ dB
Signal-to-noise ratio	
(NTSC)	
Luminance	48dB
AM	50dB
PM	50dB
(PAL/SECAM)	
Luminance	46dB
AM	49dB
PM	49dB
DG	Less than 3%
DP	Less than 3°
K-factor (2T pulse)	Less than 3%
Y/C delay	Less than 20 nsec

Audio	
Input	
MIC	−60dB, 3k ohms, balanced (600-ohm microphones permissible)
LINE	+4dBm, 10k ohms balanced
Output	
Speaker, EARPHONE (for 8-ohm earphone)	−20dBm max. (variable)
Frequency response	50Hz to 15kHz ±3dB (with standard playback machine)
Distortion	Less than 2% (with 1kHz reference level, standard playback machine)
Signal-to-noise ratio	Better than 50dB (3% distortion, with standard playback machine)

Supplied accessories	
	Shoulder strap (1) Battery compartment lid strap (1) Screws (3) 50-pin cap (1)

Dimensions



Unit: mm (inches)

BVW-20 Betacam Portable Player

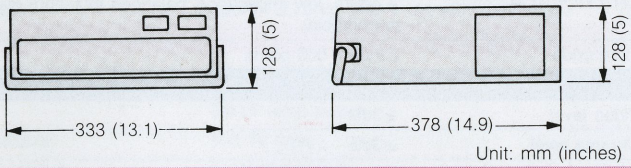
Mechanical	
Weight	Approx. 8.9 kg (19 lb 10 oz) (including two NP-1 battery packs and an HG-20 cassette)
Wow/flutter	Less than 0.15% rms
Continuous operating time	Approx. 80 min. with two fully charged battery packs NP-1 (approximately 40 min. with one)
Fast forward/rewind time	Less than 150 sec. with HG-20 cassette
Search speed	Approx. 3.5 times normal in forward and reverse directions
Connectors	
DC IN 12V	XLR type 4-pin (male)
SYNC IN	BNC type
SC IN	BNC type
VIDEO OUT 1/2	BNC type
AUDIO OUT CH-1/2 (AUDIO OUT MON)	XLR type (male)
CTDM OUT	12-pin multi-connector (female)
EARPHONE	Mini jack
VHF OUT (NTSC only)	F type
TIME CODE OUT	BNC type
Operating temperature	0°C to +40°C (32°F to 104°F)
Operating humidity	Less than 80% (relative humidity)
Storage temperature	−20°C to +60°C (−4°F to 140°F)

Electrical	
Power requirements	DC 12V (11.5V to 14V) using an NP-1 battery pack (NiCd, 1.5 Ah, optional) AC power operation using an AC-500/500CE AC adaptor (optional)
Power consumption	
Playback mode	25W
Power saving mode	3.5W

Video	
Bandwidth	
(NTSC)	
Luminance	30Hz to 4.1MHz $^{+0.5}_{-6.0}$ dB
Chrominance	R−Y: 30Hz to 1.5MHz $^{+0.5}_{-3.0}$ dB B−Y: 30Hz to 1.5MHz $^{+0.5}_{-3.0}$ dB
(PAL/SECAM)	
Luminance	25Hz to 4.0MHz $^{+0.5}_{-6.0}$ dB
Chrominance	R−Y: 25Hz to 1.5MHz $^{+0.5}_{-3.0}$ dB B−Y: 25Hz to 1.5MHz $^{+0.5}_{-3.0}$ dB
Signal-to-noise ratio	
(NTSC)	
Luminance	48dB
AM	50dB
PM	50dB
(PAL/SECAM)	
Luminance	46dB
AM	49dB
PM	49dB
K-factor (2T pulse)	Less than 3%
DG	Less than 3%
DP	Less than 3°
Y/C delay	Less than 20 nsec. (NTSC/PAL) Less than 50 nsec. (SECAM)

Input	
SYNC IN	4.0Vp-p ±6dB, 75 ohms
SC IN	2.0Vp-p ±6dB, 75 ohms
Output	
VIDEO OUT 1/2:	Composite video, 1.0 ±0.1Vp-p, 75 ohms, sync negative
CTDM OUT	
Luminance	1.0 ±0.1Vp-p, 1k ohms, sync negative
Chrominance	1.0 ±0.1Vp-p, 1k ohms, sync negative
Drop out signal	TTL level, negative
Audio	
Frequency response	50Hz to 15kHz ±3.0dB
Signal-to-noise ratio	Better than 50dB (3% distortion, without Dolby NR system)
Distortion	Less than 2% (at 1kHz reference level)
AUDIO OUTPUT CH-1/ CH-2/MONITOR	+4dBm, low impedance, balanced (600-ohm load permissible)
Time code	2.2Vp-p ±3dB, 600 ohms
Supplied accessories	
	ANS-32 antenna selector (1) (NTSC only) Coaxial cable with F-type connector (1) (NTSC only) EX-41 extension board (1)

Dimensions

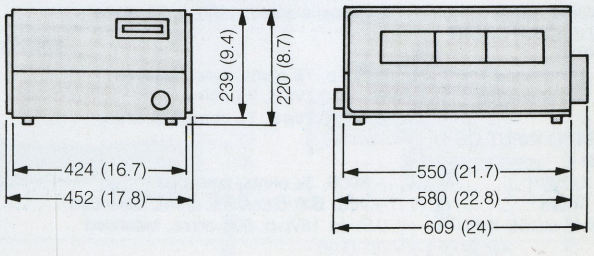


Unit: mm (inches)

BVW-10 Betacam Player

Mechanical	
Weight	Approx. 30 kg (66 lb 2 oz)
Wow/flutter	Less than 0.15% rms
Fast forward/rewind time	Less than 90 sec with an HG-20 cassette
Search speed	
SHUTTLE	Still, 1/30, 1/10, 1/5, 1/2, 1, 2, 5 and 10 times normal in forward and reverse directions
JOG	Still to 1 in forward and reverse directions
Connectors	
AC IN	3-wire parallel ground
VIDEO OUT 1/2	BNC type
AUDIO OUT CH-1/ CH-2/MONITOR	XLR type (male)
TIME CODE OUT	BNC type
DUB OUT (U-matic)	7-pin (female)
DUB/COMP OUT	12-pin (female)
MONITOR	8-pin
REMOTE 1	9-pin
REMOTE 2	36-pin
HEADPHONES	JM-60 headphone stereo phone jack
REF VIDEO IN 1/2	BNC type
Operating temperature	5°C to +40°C (41°F to 104°F)
Storage temperature	−20°C to +60°C (−4°F to 140°F)
Electrical	
Power requirements	AC 90 to 265V, 48 to 64Hz
Power consumption	160W
Video	
Bandwidth	
(NTSC/PAL-M)	
Luminance	30Hz to 4.1MHz $^{+0.5}_{-6.0}$ dB
Chrominance	R−Y: 30Hz to 1.5MHz $^{+0.5}_{-3.0}$ dB
	B−Y: 30Hz to 1.5MHz $^{+0.5}_{-3.0}$ dB
(PAL/SECAM)	
Luminance	25Hz to 4.0MHz $^{+0.5}_{-6.0}$ dB
Chrominance	R−Y: 25Hz to 1.5MHz $^{+0.5}_{-3.0}$ dB
	B−Y: 25Hz to 1.5MHz $^{+0.5}_{-3.0}$ dB
Signal-to-noise ratio	
(NTSC/PAL-M)	
Luminance	48dB
AM	50dB
PM	50dB
(PAL/SECAM)	
Luminance	46dB
AM	49dB
PM	49dB
K-factor (2T pulse)	Less than 3%
DG	Less than 3%
DP	Less than 3°
Y/C delay	Less than 20 nsec. (NTSC/PAL/PAL-M) Less than 50 nsec. (SECAM)
Input	
REF VIDEO IN	1.0Vp-p±0.3V, 75 ohms
Output	
VIDEO OUT 1	Composite video, 1.0Vp-p, 75 ohms, sync negative
VIDEO OUT 2	Composite video, 1.0Vp-p, 75 ohms, sync negative Non-composite, (NTSC) 0.714Vp-p, 75 ohms (PAL/SECAM/PAL-M) 0.7Vp-p, 75 ohms
DUB OUT (U-matic)	
(NTSC/PAL-M)	
Luminance	1.7Vp-p, 500 ohms, sync negative
Chrominance	0.9Vp-p, 1k ohms, SC low-range conversion
(PAL/SECAM)	
Luminance	0.5Vp-p, 75 ohms, sync negative
Chrominance	0.5Vp-p, 75 ohms, SC low-range conversion
DUB/COMPONENT OUT	
Luminance	1.0Vp-p, 75 ohms, sync negative
Chrominance	R−Y: 0.7Vp-p, 75 ohms B−Y: 0.7Vp-p, 75 ohms
Audio	
Frequency response	50Hz to 15kHz ±3.0dB
Signal-to-noise ratio	Better than 50dB (3% distortion level, without the audio NR system)
Distortion	Less than 2% (1kHz reference level)
AUDIO OUT CH-1/CH-2/ MONITOR	+4dBm, low impedance, balanced (600-ohm load permissible)
Time code	2.2Vp-p, 600 ohms
Processor adjustment range	
Video level	±3dB
Chroma level	±3dB
Set-up level/Black level	0 to +15 IRE/0 to 0.15V
Hue/Burst chroma phase	±15°
System SC phase	360°p-p
System sync phase	+3 to −1 μsec.
Y/C delay	±50 nsec.
Supplied accessories	
	AC power cord (1) Remote control cable RCC-5G (9-pin to 9-pin) (1)

Dimensions



Unit: mm (inches)

Betacam Specifications

BVW-40 Betacam Recorder

Mechanical	
Weight	Approx. 38.7 kg (85 lb 5 oz)
Wow/flutter	Less than 0.15% rms
Fast forward/rewind time	Less than 90 sec. with an HG-20 cassette
Search speed	
SHUTTLE	Still, 1/30, 1/10, 1/5, 1/2, 1, 2, 5 and 10 times normal in forward and reverse directions
JOG	Still to 1 in forward and reverse directions
Connectors	
AC IN	3-wire parallel ground
VIDEO INPUT	BNC type
VIDEO OUTPUT 1/2	BNC type
AUDIO INPUT CH-1/ CH-2/monitor	XLR type (male)
DUB/COMPONENT INPUT	12-pin (male)
DUB/COMPONENT OUTPUT	12-pin (female)
DUB (U-matic) OUTPUT	7-pin (female)
REMOTE 1	9-pin
REMOTE 2	36-pin
MONITOR	8-pin
TBC REMOTE	15-pin (male)
REF VIDEO INPUT	BNC type
REF VIDEO OUT	BNC type
TIME CODE IN	XLR type (female)
TIME CODE OUT	XLR type (male)
HEADPHONES	JM-60 stereo phone jack
Operating temperature	5°C to +40°C (41°F to 104°F)
Storage temperature	−20°C to +60°C (−4°F to +140°F)

Electrical	
Power requirements	AC 90V to 265V, 48 to 64Hz
Power consumption	280W

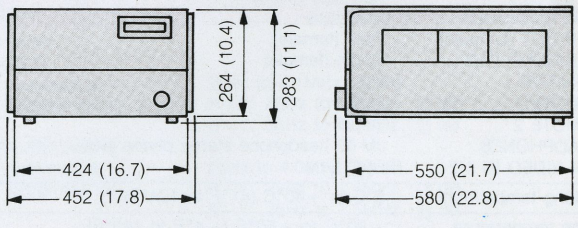
Video	
Bandwidth	
(NTSC)	
Luminance	30Hz to 4.1MHz $^{+0.5}_{-6.0}$ dB
Chrominance	R−Y: 30Hz to 1.5MHz $^{+0.5}_{-3.0}$ dB
	B−Y: 30Hz to 1.5MHz $^{+0.5}_{-3.0}$ dB
(PAL/SECAM)	
Luminance	25Hz to 4.0MHz $^{+0.5}_{-6.0}$ dB
Chrominance	R−Y: 25Hz to 1.5MHz $^{+0.5}_{-3.0}$ dB
	B−Y: 25Hz to 1.5MHz $^{+0.5}_{-3.0}$ dB
Signal-to-noise ratio	
(NTSC)	
Luminance	48dB
AM	50dB
PM	50dB
(PAL/SECAM)	
Luminance	46dB
AM	49dB
PM	49dB
K-factor (2T pulse)	Less than 3%
DG	Less than 3%
DP	Less than 3°
Y/C delay	Less than 20 nsec. (NTSC/PAL) Less than 50 nsec. (SECAM)
Inputs	
REF VIDEO INPUT	1.0Vp-p ±0.3V, 75 ohms
VIDEO INPUT	Composite video, 1.0Vp-p, 75 ohms
DUB/COMPONENT INPUT	
Luminance	1.0Vp-p, 75 ohms, sync negative
Chrominance	R−Y: 0.7Vp-p, 75 ohms
	B−Y: 0.7Vp-p, 75 ohms
AUDIO INPUT CH-1/ CH-2	
LOW	−60dB, 3k ohms, balanced
HIGH	+4dB, 600 ohms/10k ohms, balanced
TIME CODE INPUT	0.5V to 18Vp-p, 600 ohms, balanced
Outputs	
VIDEO OUTPUT 1	Composite video, 1.0Vp-p, 75 ohms, sync negative
VIDEO OUTPUT 2	Composite video: 1.0Vp-p, 75 ohms, sync netative Non composite video: (NTSC) 0.714Vp-p, 75 ohms (PAL/SECAM) 0.7Vp-p, 75 ohms
DUB OUT (U-matic)	
(NTSC)	
Luminance	1.7Vp-p, 500 ohms, sync negative
Chrominance	0.9Vp-p, 1k ohms, SC low-range conversion
(PAL/SECAM)	
Luminance	0.5Vp-p, 75 ohms, sync negative
Chrominance	0.5Vp-p, 75 ohms, SC low-range conversion
DUB/COMPONENT OUTPUT	
Luminance	1.0Vp-p, 75 ohms, sync negative
Chrominance	R−Y: 0.7Vp-p, 75 ohms
	B−Y: 0.7Vp-p, 75 ohms

Audio	
Frequency response	50Hz to 15kHz ±3dB
Signal-to-noise ratio	Better than 50dB (at 3% distortion level, without the audio NR system)
Distortion	Less than 2% (1kHz reference level)
AUDIO INPUT CH-1/CH-2	
LOW	−60dBm, 3k ohms, balanced
HIGH	+4dBm, 10k ohms, balanced
AUDIO OUTPUT CH-1/ CH-2/MONITOR	+4dBm, low impedance, balanced (600-ohm load permissible)
Time code	2.2Vp-p, 600 ohms

Processor adjustment range	
Video level	±3dB
Chroma level	±3dB
Set-up level/Black level	0 to +15 IRE/0 to 0.15V
Hue/Burst chroma phase	±15°
System SC phase	360°p-p
System sync phase	+3 to −1 μsec.
Y/C delay	±50 nsec.

Supplied accessories
AC power cord (1)
RCC-5G 9-pin remote control cable (1)
12-pin dubbing cable (1)
Extension board A (1)
Extension board B (1)
Extension board C (1)
Operation and maintenance manual (1)

Dimensions

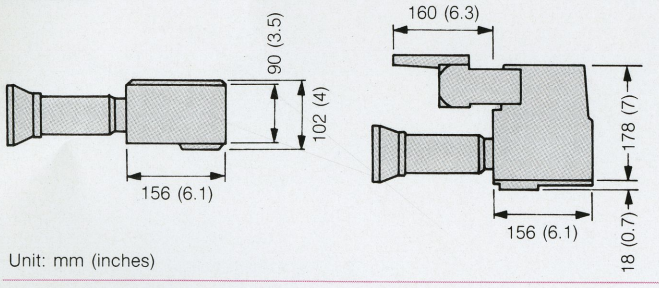


Unit: mm (inches)

BVP-1 Betacam Camera

Camera	
Pick-up tube	2/3-inch HBST tube
Built-in filters	1: 3200°K 2: 5200°K + 1/4 ND 3: 5200°K 4: 6800°K
Lens mount	Special bayonet mount
Video output	1.0Vp-p, sync negative, 75 ohms
Horizontal resolution	400 TV lines
Sensitivity	2000 lux with F4, 90% reflectance
Output level	0dB, +6dB or +12dB (selectable)
Minimum illumination	Approx. 80 lux (with F1.6 lens, +12dB gain)
Connectors VTR MONITOR	 50-pin BNC type
Signal-to-noise ratio	NTSC: 54dB (typical) PAL/SECAM: 53dB (typical)
Power requirements	DC 12V (10.3V to 17V)
Power consumption	11W (NTSC/PAL) 12W (SECAM)
Warm-up time	4 seconds from pre-heat condition
Operating temperature	−20°C to +45°C (−4°F to +113°F)
Storage temperature	−20°C to +50°C (−4°F to +122°F)
Weight	Approx. 2.75 kg (6 lb 1 oz) with viewfinder
Viewfinder	
Picture tube	1.5-inch monochrome BRIGHT control, CONTR control, TALLY lamp switch
Resolution	350 TV lines
Microphone	Sharp-directional
Supplied accessories	
	Extension board × 1 Tripod adaptor plate × 1 Extractor × 1 Wind screen × 1 50-pin cap × 1 Mount cap × 1 Shoulder pad × 1

Dimensions

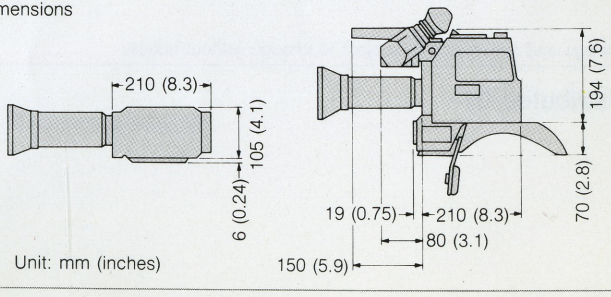


Unit: mm (inches)

BVP-3/30 Betacam Camera

Camera	
Pick-up tube BVP-3 BVP-30	 2/3-inch MF "SATICON" (magnetic focus, static deflection) 2/3-inch Diode Gun Plumbicon™ (magnetic focus, static deflection)
System	RGB 3-tube system
Optical system	F1.4 prism system
Built-in filters	1: 3200°K 2: 5600°K + 1/4 ND 3: 5600°K 4: 5600°K + 1/16 ND
Lens mount	Special bayonet mount
Video output	1.0Vp-p, 75 ohms, sync negative Two outputs (TEST OUT, VTR connector)
Connectors VTR TEST OUT LENS REMOTE	 50-pin BNC type 6-pin, 12-pin 6-pin
Sensitivity BVP-3 BVP-30	 2000 lux with F4, (typical), 90% reflectance 2000 lux with F4.5 (typical), 90% reflectance
Minimum illumination BVP-3 BVP-30	 Approx. 30 lux (F1.4 lens, +18dB gain) Approx. 25 lux (F1.4 lens, +18dB gain)
Video signal-to-noise ratio	NTSC/PAL-M: 58dB (typical) PAL/SECAM: 56dB (typical)
Horizontal resolution	BVP-3: 650 TV lines at center (typical) BVP-30: 650 TV lines at center (typical)
Registration	0.1% for Zone I (within circle with a diameter corresponding to 80% of picture height) 0.15% for Zone II (within circle with a diameter corresponding to picture width) 0.3% for Zone III (others)
Geometric distortion	Less than 1%
Power requirements	DC 12V (10.5V to 17V)
Power consumption BVP-3 BVP-30	 20W (NTSC/PAL/PAL-M) 22W (SECAM) 24W (NTSC/PAL/PAL-M) 26W (SECAM)
Warm-up time	3.5 seconds (from pre-heat condition)
Operating temperature	−20°C to +40°C (−4°F to +104°F)
Storage temperature	−20°C to +50°C (−4°F to +122°F)
Weight	Approx. 4.3 kg (9 lb 7 oz) with viewfinder
Viewfinder	
Picture tube	1.5-inch monochrome BRIGHT control, CONTR control, TALLY ON/OFF switch
Resolution	400 TV lines
Microphone	Sharp-directional
Supplied accessories	
	Tripod adaptor × 1 Tripod bracket × 1 Extension board × 1 Extractor × 1 Chart for the automatic centering adjustment × 1

Dimensions



Unit: mm (inches)

BETACAM

*Design and specifications subject to change without notice.

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